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TROPICAL DISEASES BULLETIN

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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

Vol. 52] 1955 [No. 1

SUMMARY OF RECENT ABSTRACTS *

I. CHOLERA †

General : Aetiology

POLLITZER (p. 1154) has published the first of a series of studies on cholera. In this he gives an account of the history of the disease (of which a long informative abstract has been made by Sir John TAYLOR). This account, and especially the part which deals with the great pandemics of the 19th Century, should be read in full.

GALLUT (p. 58) has previously shown that there is a heat-stable O antigenic fraction common to *V. cholerae* and to *Brucella abortus suis* and *Br. melitensis*, and that this is in the C factor characteristic of the Inaba vibrio. He now shows that when anti-Inaba (AC) serum is absorbed with *Brucella abortus suis*, the C antibody is not completely exhausted, and a pure monospecific A serum cannot be obtained by this method. The same author (p. 1060) examined strains of *V. cholerae* isolated from patients at various stages of the disease, and tested them for toxicity in mice. He found considerable variation from case to case, and also in strains from the same patients at different stages of the disease. Highly toxic strains were often found 52–62 hours after onset. The emergence of these toxic strains may be due to selective multiplication or to some toxigenic factor temporarily present in the patient.

When broth cultures of *V. cholerae* and *Bact. coli* were incubated together, the *Bact. coli* were gradually eliminated, and after about a month pure cultures of *V. cholerae* were found. SARKAR and TRIBEDI (p. 177) do not regard this as the effect of change in *p*H (to the alkaline side) which occurs, but attribute it to a thermolabile colicidal substance. *Bact. coli* could grow in cultures in which the *V. cholerae* had been killed by heat.

After injecting a culture of *V. cholerae* into a loop of rabbit intestine, isolated between ligatures, and returning the loop to the abdomen, DE and CHATTERJE (p. 581) demonstrated changes in the submucosa which indicated that the action of the vibrio or its products had been to increase the

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1954, v. 51. Reference to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on cholera in this series see the January issues of the *Tropical Diseases Bulletin* each year since 1939.

permeability of the intestinal capillaries, with a consequent outpouring of fluid into the lumen.

It is possible that mucinase plays a part in the pathogenesis of cholera (though this has not been proved) and JENSEN (p. 176) has prepared a vaccine by adding to a suspension of washed *V. cholerae* a filtrate of the fluid from an agar culture, containing mucinase, and then adding merthiolate to 0·01 per cent. This is lyophilized, to be rehydrated before use. When merthiolate is used the antimucinase response is moderate, but if heat, phenol or formalin is used it is very poor. It is known that mucinase in filtrates of *V. cholerae* may cause desquamation of the intestinal mucosa of guineapigs. GURKRIPAL SINGH and AHUJA (p. 691) tested strains of cholera and other vibrios for production of mucinase, finding that its production is not confined to *V. cholerae* but is shared by other members of the vibrio group. The observations made leave it in doubt whether the enzyme plays a rôle in the causation of the cholera syndrome. Immunization of animals with cholera and non-cholera strains did not protect against the desquamating action of filtrates of homologous or heterologous strains, which contain mucinase, as tested on strips of ileum from the immunized animals. Investigating the enzymes produced by *V. cholerae* and other organisms, NARAYANAN *et al.* (p. 691) found that mucinase, collagenase, and lipase were produced by them all, and elastinase by a proportion of each class. It is not possible, therefore, to say whether the enzymes may play a part in the pathogenesis of cholera.

IYER *et al.* (p. 1244) investigated the effect of sodium chloride on the aspartic acid deaminase of *V. cholerae*.

AGARWALA *et al.* (p. 1244) describe the metabolism of purine and pyrimidine compounds by vibrios.

DE *et al.* (p. 916) have made a study of the haemolytic activities of *V. cholerae* and related vibrios. They conclude that calcium is necessary for the lysis of human red cells by *V. cholerae*, but that it inhibits the haemolytic action of El Tor and non-agglutinable vibrios. The calcium content of human plasma is enough to permit haemolysis, and as the haemolysin, being diffusible, may reach the circulation, it may therefore cause intravascular haemolysis and haemoglobinuria. The haemolysin is adsorbed by bacterial filters, and its absence from filtrates does not prove, therefore, that intravascular haemolysis does not take place. Haemolysin was produced by 14 strains of vibrio (some from water, others including El Tor and Celebes strains, but not *V. cholerae*); BRÜCK and BRANDIS (p. 580) show that the haemolysin could be demonstrated in Berkefeld filtrates but not Seitz filtrates, and that it remained active in broth cultures subjected to 50°C. for up to 40 minutes.

Pathology: Treatment: Control

A study of the bone marrow in cholera by ATA (p. 1158) showed no great departures from the normal values for the white-cell or the red-cell series.

GOHAR (p. 382) made *in vitro* and *in vivo* (animal) tests of the action of certain antibiotics and sulphonamides against *V. cholerae*, as a result of which he concluded that oral administration of dihydrostreptomycin in combination with sulphaguanidine or sulphasuxidine could be recommended for clinical trial. CHAKRAVARTY (N.) (p. 916) reports a study of a large number of cholera patients treated in a Calcutta hospital with sulphaguanidine and saline. The general case mortality was 29·6 per cent., the highest rate (64 per cent.) being in persons over 60 years old. The Ogawa infections were rather more fatal than the Inaba infections. There were

indications of epidemic waves in the spring. Chakravarti (H. S.) *et al.* (p. 918) have treated patients with chloramphenicol and saline and conclude that the drug produced little benefit other than the relatively early appearance of formed stools.

Seal *et al.* (p. 692) have tried aureomycin in cholera, comparing it with sulphaguanidine; both groups, and the controls, received the usual saline treatment. There was no indication that aureomycin influenced the course of the attacks, but the period during which vibrios could be isolated from the stools was apparently somewhat shortened. In experiments on cholera in mice Nagao (p. 383) found that chloramphenicol and a new antibiotic (roseomycin) were fairly effective in preventing death; they also showed activity against the vibrio *in vitro*.

Lahiri and Basu (p. 1158) used *nor*adrenaline to combat the " secondary shock " of cholera—it causes an increase in total peripheral vascular resistance and has been described as the most rational agent in hypotension of peripheral origin. It was given only after the administration of 6–13 pints of saline intravenously.

Chatterjee (p. 381) claims that the administration of the juice of a common Bengal plant (*Coleus aromaticus*) is valuable in controlling the diarrhoea of cholera, and combines this with administration of a proprietary promethazine-chlorotheophylline preparation for checking the vomiting.

An investigation by Chakravarti *et al.* (p. 382) indicated that neither vitamin C nor an antihistamine drug had any effect on the prevention or treatment of uraemia in cholera.

Rogers (p. 580) has long advocated compulsory inoculation for the control of cholera in pilgrims in India, and now quotes figures, in relation to the application of this measure in 1940, which indicate that by this means the heavy incidence and mortality during the great Fairs have been very greatly reduced. He discusses the epidemiological factors, such as failure of the monsoon, which affect the spread of the disease. *Charles Wilcocks*

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Chronicle World Health Organization. 1954, Apr., v. 8, No. 4, 117–28.

First Asian Malaria Conference.

The first Asian Malaria Conference convened by WHO met in Bangkok in September 1953 and attracted representatives from most countries of South-east Asia. Much material had been collected by preliminary questionnaires which with subsequent discussion showed that there has been a wide extension of control by residual insecticides to which almost all the known vectors in South-east Asia are almost certainly susceptible, while special enquiries are now being made to ascertain whether *Anopheles punctulatus* and *A. leucosphyrus*, which are predominantly exophilic, can be controlled in this way. It was noted that the exophilic *A. minimus flavirostris* has been shown to be controllable. No evidence of anopheline

resistance has been reported in the countries concerned, though bed-bugs and flies have developed resistance in some places. It was noted that supplies of water-dispersible powders tend to deteriorate below specification in tropical climates and the physical deterioration may be associated with chemical decomposition of the insecticide and thereby interfere with the efficacy of control.

The benefits which have already been secured are impressively recounted in terms of vital statistics, agricultural improvement, increase in industrial working and increase in family incomes. The Conference clearly advocated the establishment in every malarious country of a specific organization for malaria control but did not adopt any standardized form, recognizing the need for adaptation to circumstances. It appears, however, to have been unanimous in considering that community participation by the supply of voluntary labour had been found to be entirely unsatisfactory; the participation of the community is welcome but it is recommended more in the form of financial and material support to specialized workers. In this connexion the raising of taxes for malaria control is discussed and it was concluded that any tax for this purpose should be of a general nature related to the enhanced economy of the area following the establishment of malaria control. The help given by foreign aid is acknowledged and it is hoped that it will continue, but the Conference considered that Asian countries should look forward to being self-supporting in this respect.

In the discussion on the regional coordination of long-term programmes it was agreed that material advantages could be gained by their integration across state or national boundaries, but it was thought that at present the approach towards this coordination should largely be of an informal nature and that it might be considerably helped by the periodic calling of Conferences such as the present one. Cooperation might also be further developed in the field of training; that for subordinate staff should preferably be local, but there might well be an extension or international arrangement supported by WHO for training of higher staff and taking the form both of participation in formal instruction and travel studies.

The concluding recommendations refer specifically to the need to make careful evaluation of the result of malaria control and the advantages accruing from it; the form of organization advised; the necessity for further reduction in costs by increase in efficiency; the desirability of merging areas of control both within and outside the borders of the countries concerned on an inter-country, intra-regional and inter-regional plane and the extension of international facilities for training. *G. Macdonald*

Janz, G. J. O índice esplénico nos escolares de S. Tomé. [**Splenic Index in Children in São Tomé (Gulf of Guinea)**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 3, 1801–10, 3 figs.

The English summary appended to the paper is as follows:—

"The determination of the splenic index of the native school children of S. Tomé city, under the age of 10, revealed a percentage of 30·5 in the children living in the city and 30·2 in those living in the outskirts. The determination of the same index in the half-caste children, in the same conditions, gave a percentage of 45·6 and 72·7 respectively. These observations show that it is better to consider the data concerning both groups separately than to consider them in the whole, when dealing with a population with a high proportion of half-caste people."

Brunetti, Rosemary, Fritz, R. F. & Hollister, A. C., Jr. **An Outbreak of Malaria in California, 1952–1953.** *Amer. J. Trop. Med. & Hyg.* 1954, Sept., v. 3, No. 5, 779–88, 3 figs. [16 refs.]

[See this *Bulletin*, 1954, v. 51, 454.]

Pringle, G. **The Identification of the Adult Anopheline Mosquitoes of Iraq and Neighbouring Territories.** *Bull. Endem. Dis.* Baghdad. 1954, July, v. 1, No. 1, 53–76, 46 figs. on 7 pls. [12 refs.]

The following mosquitoes of the genus *Anopheles* have been recorded from Iraq: *algeriensis, marteri, claviger, sacharovi, maculipennis* (typical form), *hyrcanus, dthali, fluviatilis, multicolor* (the inclusion of *multicolor* rests on the reputed capture of the an adult at Sedat-al-Hindiyeh in May 1943), *superpictus, stephensi, pulcherrimus.*

The author discusses the taxonomic status, synonymy and distribution of these species as well as those of 9 others which occur in adjacent territories and which have so far not been recorded from Iraq; *melanoon subalpinus, sogdianus, plumbeus, coustani, turkhudi, sergenti, culicifacies, apoci* and *rupicolus.*

An illustrated key is provided for the identification of the adults of these anophelines. *H. S. Leeson*

Gillies, M. T. **Biological Races of** *Anopheles gambiae.* [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, Sept., v. 48, No. 5, 443–5.

The author has elsewhere [this *Bulletin*, 1954, v. 51, 760] criticized the evidence put forward by Holstein [*ibid.*, 1953, v. 50, 360] that biological races of *Anopheles gambiae* can be separated by examining the maxillary index of a representative sample. A recent classification by Senior-White of behaviour patterns of adult anophelines [*ibid.*, 1954, v. 51, 760], although generally valuable, recognizes an endophilic, zoophilic race of *A. gambiae* and also an exophilic, anthropophilic race, on the basis of the publication which the present author originally questioned. The present note is deemed necessary to re-emphasize the original criticism that, since the breeding up of larvae of a single parent female of *A. gambiae* under different conditions produces differences in maxillary indices in the adults as great as those presented as evidence of racial differences of biological significance, the validity of this character as denoting racial forms of the species is unsound.

A further point is questioned and concerns the relationship between resting place (outdoors or indoors) and host (man or animal) and the maxillary index. Available facts indicate that the index is not consistently related to whether man or cattle served as host, or to resting places.

Briefly, it appears that growth of larvae in small, temporary collections of water or in small wells results in a low maxillary index in the females which emerge from them; higher indices follow larval development in large swamps rich in organic matter and aquatic life. Other associations with high and low indices so far reported seem to be indirect and incidental to this fundamental cause. The evidence for biological races of *A. gambiae* differing in host preference and resting habits is, in the author's opinion and experience, not proven. *D. S. Bertram*

Bhombore, S. R., Sitaraman, N. L. & Achuthan, C. **A First Record of *Anopheles theobaldi* Giles, 1901, from Mysore State.** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 45–6.

Vargas, L. & Martínez Palacios, A. Algunas observaciones sobre distribución geográfica y variaciones estacionales de los *Anopheles* del noreste de México. [**Observations on the Geographical Distribution and Local Variation of the *Anopheles* of N.E. Mexico**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1953, Dec., v. 13, No. 4, 321–30. English summary.

Giglioli, G. & Charles, L. J. **Reappearance of *Anopheles darlingi* Root in a Controlled Area of British Guiana's Coastlands.** *Amer. J. Trop. Med. & Hyg.* 1954, Sept., v. 3, No. 5, 808–16, 2 figs.

The reappearance in 1951 of small numbers of *Anopheles darlingi* in the coastlands of British Guiana, where it had transmitted severe endemic malaria until the successful campaign of eradication by DDT residual spraying was established in 1947 [this *Bulletin*, 1949, v. 46, 183; 1952, v. 49, 662], was restricted to the east in the vicinity of a new drainage-irrigation scheme. This created canals, trenches, and numerous borrow pits besides a variety of temporary and permanent premises and greater traffic to the area from an inland creek which was a source of the mosquitoes. By an emergency programme of residual spraying of houses of the affected area with DDT as a supplement to the routine policy of spraying certain barrier zones through which the mosquito is liable to penetrate to the protected coastal belt, the invasion was stopped. No specimens of *A. darlingi* were found in two checks at 3-month intervals after the emergency measures were concluded in January 1952. *D. S. Bertram*

de Andrade, R. M. Observações sôbre a hidrobiologia do *Anopheles tarsimaculatus*: II. Relação com alguns elementos físicos e químicos da água dos criadouros. [**Hydrobiological Observations on *Anopheles tarsimaculatus*. II. Relationships to Some Physical and Chemical Elements of Water in Breeding Places**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1953, Apr., v. 5, No. 2, 145–56. [11 refs.] English summary.

The English summary appended to the paper is as follows:—

"The author presents some results of physical and chemical analyses, performed during October–December 1951, of water of breeding foci of *Anopheles tarsimaculatus* of the district where the Instituto de Malariologia is located (Duque de Caxias county, state of Rio de Janeiro). Data refer to temperature of water and air, pH, total acidity, mineral acidity and chlorine from chlorides. In the discussion, the author uses data relating to *A. argyritarsis* for comparison.

"The results were as follows:

"1. No correlations were observed between the variations of water and air temperature and the variations of the anopheline larval density.

"2. Larvae of *A. tarsimaculatus* showed a marked acidophily, contrasting with those of *A. argyritarsis* which presents a less regular distribution of pH values, though clustering around the neutrality.

"3. The tolerance of *tarsimaculatus* for total acidity was markedly higher than that of *argyritarsis*.

"4. *A. tarsimaculatus* showed a similar tolerance for high concentration of mineral acidity.

"5. The water of all breeding foci of the area studied showed a low concentration of chlorine from chlorides (less than 0·5 g/l)."

[For Part I, see this *Bulletin*, 1954, v. 51, 251.]

See also p. 49, Sicart, Les fièvres récurrentes protègent-elles contre le paludisme? (Observations faites en Tunisie.) [**Do Relapsing Fevers protect one against Malaria? (Observations in Tunisia)**].

Field, J. W., Strahan, J. H., Edeson, J. F. B. & Wilson, T. **Studies on the Chemotherapy of Malaria. II. The Treatment of Acute Malaria with Proguanil (Paludrine).** *Med. J. Malaya.* 1954, June, v. 8, No. 4, 303–17, 5 figs.

During the period 1947–53, 709 Asian patients suffering from acute malarial attacks (538 *P. falciparum*, 150 *P. vivax*, 21 *P. malariae*) were treated with proguanil in Kuala Lumpur. All were of Malay, Chinese or Indian race and were classed as semi-immunes. Two hundred and forty-seven patients were given single-dose treatment with 100 mgm., 250 mgm. or 300 mgm. proguanil; 436 received a full course of 300 mgm. daily for 5 to 7 days; 26 patients suffering from severe *P. falciparum* malaria were given proguanil by intramuscular or intravenous injection.

In *P. falciparum* malaria the clinical response was often slow, but for the first 2 years clearance of asexual parasites was satisfactory, even with a single dose of 100 mgm. Late in 1948 the first failure with single-dose treatment was noted, and early in 1949 the first failure with a full course of 300 mgm. daily for 5 to 7 days. [The criterion of failure was persistence of asexual parasitaemia 7 days after beginning treatment, or where therapeutic intervention with another drug was found necessary before the 7th day.] By 1950 about half the patients treated with a full course of the drug failed to respond and this continued to be the case during the remainder of the period under review.

In *P. vivax* malaria clinical response and clearance of parasites were slow, but no actual failures were noted till early in 1951; the proportion of failures continued to remain at a low level.

P. malariae infection has become increasingly rare in Malaya in recent years. In the few cases treated the response was slow with the single-dose treatment used; no failures were noted.

Artificial feeding experiments with *Anopheles maculatus* indicated that sporogony in the mosquito is arrested at an early stage.

In a discussion on the problems associated with proguanil resistance, it is noted that resistant strains are not confined to any one part of Malaya but can be found in various parts of the country if looked for; their natural transmission despite regular prophylactic doses of proguanil is now known to be possible. Chloroquine, amodiaquine, mepacrine and quinine all proved effective in the treatment of proguanil-resistant infections. It is noted that quinine is a poor suppressive drug, but that any of the others

named above can be relied upon should a serious decline in the efficacy of suppressive proguanil occur. *G. Covell*

PATEL, J. C. & DALAL, S. D. **Treatment of Malaria with a Single Dose of Amodiaquin (Camoquin).** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 71–6, 1 chart. [13 refs.]

Thirty-three patients suffering from acute attacks of malaria (20 *P. vivax*, 7 *P. falciparum*, 6 mixed *P. vivax* and *P. falciparum*) were treated with a single dose of 500 mgm. amodiaquine (base). This is equivalent to approximately 10 mgm./kgm. body weight for an average Indian.

With one exception the clinical response was satisfactory, the average duration of fever being 18 hours in *P. vivax* and 14 hours in *P. falciparum* infection. The average time for disappearance of asexual parasitaemia was 42·2 and 48 hours, respectively. No toxic reactions were observed.

One case of *P. falciparum* malaria treated on 4th November 1948 proved refractory. The temperature fell to normal after 56 hours and the patient left hospital, but was readmitted on 18th November with 2 days' history of renewed pyrexia and with parasites in the blood. The treatment was repeated but fever continued and parasites were observed in the peripheral blood for 96 hours. Another dose of 500 mgm. of amodiaquine base was given on 25th November and the fever appeared to be defervescing, but 3 days later there was another bout of pyrexia with persistent parasitaemia. On 4th December 15 grains of quinine were given by mouth followed on the next day by 10 grains intramuscularly combined with proguanil 100 mgm. orally thrice daily. The fever now subsided and the patient was discharged 2 days later.

The authors nevertheless conclude that a single large dose of amodiaquine is an effective, safe and rapid remedy for the treatment of malaria in practice. [For earlier trials by the senior author and MEHTA, see this *Bulletin*, 1949, v. 46, 436.] *G. Covell*

WINCKEL, C. W. F. **When to use the 8-Aminoquinolines in the Treatment of Malaria, especially Primaquine.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1954, Sept., v. 6, No. 3, 280–87. [Numerous refs.]

A general review and discussion.

BEUTLER, E., DERN, R. J. & ALVING, A. S. **The Hemolytic Effect of Primaquine. IV. The Relationship of Cell Age to Hemolysis.** *J. Lab. & Clin. Med.* 1954, Sept., v. 44, No. 3, 439–42, 1 fig. [13 refs.]

In a previous study it has been shown that when 30 mgm. of primaquine are administered daily to persons whose erythrocytes are primaquine-sensitive, an acute haemolytic anaemia develops [this *Bulletin*, 1954, v. 51, 676]. It has also been established that the erythrocytes of sensitive persons either develop tolerance to primaquine or form a heterogeneous population with respect to their sensitivity to the haemolytic action of the drug. In the investigation now recorded the sensitivity of tagged young erythrocytes has been compared with that of tagged older erythrocytes to determine whether the population is heterogeneous in this respect. The authors summarize their results as follows:—

"Erythrocytes of uniform age from a primaquine-sensitive individual were labelled with Fe^{59}. When the labelled erythrocytes were 8 to 21 days old, they were insensitive to the hemolytic action of primaquine; 55 days later the same cells were rapidly destroyed when another course of primaquine was administered. This finding further strengthens the relationship between hemolysis by primaquine and hemolysis by certain aniline derivatives. The increased sensitivity of older cells is believed to suggest that a deficiency in one of the red cell enzymes may play a role in primaquine sensitivity." *G. Covell*

Arnold, J., Alving, A. S., Hockwald, R. S., Clayman, C. B., Dern, R. J., Beutler, E. & Jeffery, G. M. **The Effect of Continuous and Intermittent Primaquine Therapy on the Relapse Rate of Chesson Strain *vivax* Malaria.** *J. Lab. & Clin. Med.* 1954, Sept., v. 44, No. 3, 429–38, 1 fig.

In the experiments here recorded, the prophylactic activity of primaquine was compared with that of quinine, chloroquine, quinacrine [mepacrine] and pamaquin. A study was also made of prophylactic cure with primaquine alone and of suppressive cure with primaquine and chloroquine combined. The parasite used was the Chesson strain of *Plasmodium vivax*, a prominent feature of which is a tendency to produce early relapse.

Causal prophylactic action. Preliminary tests were made with quinine, chloroquine and mepacrine, the drug being given in each case on the day before infection and on the first 6 days after infection. Quinine was also tested by giving it for 13 days after infection. The daily dose of quinine was 1·64 gm., of chloroquine base 275 mgm. and of mepacrine 400 mgm. One subject only out of 82 treated by one or other of these drugs failed to develop overt malaria.

In similar tests with pamaquin, 31·5 mgm. base daily failed to protect 4 out of 5 volunteers; and it had been previously shown that a daily dose of 90 mgm. was required to protect 3 out of 5 volunteers [this *Bulletin*, 1948, v. 45, 951]. Since 90 mgm. daily represents the upper limit of tolerance for pamaquin, the use of this drug in prophylaxis is obviously ruled out. Primaquine on the other hand in single daily doses of 30 mgm. base protected all the 10 subjects tested. No evidence of toxicity was observed with this dosage.

Intermittent (semi-weekly) prophylactic action. Twelve volunteers received a single dose of 30 mgm. primaquine base on Wednesday and Sunday each week, beginning on the day of infection and continuing for 4 weeks. [This represents the same total dose of the drug as that given in the daily prophylactic experiments cited above.] All the subjects except two failed to develop overt malaria.

Intermittent (weekly) suppressive cure. Five volunteers received primaquine alone in single weekly doses of 30 mgm. base for 15 weeks. Patency was not prevented by the first 2 doses, which were given during the period when the clinical attack normally develops, and chloroquine base 1,000 mgm. over 24 hours was given to control parasitaemia. Further treatment with this dosage of chloroquine was given each time patency occurred during the 15-week period. Two subjects in this series remained free of malaria for 21 and 52 weeks, respectively, after the last dose of drug.

Ten volunteers received 30 mgm. primaquine base combined with 300 mgm. chloroquine base in a single weekly dose for 15 weeks after infection. All but two remained free of parasitaemia and clinical symptoms during the course of therapy and for 15 to 51 weeks after the last dose.

This regimen was well tolerated by Negroes, who incur an appreciable risk of haemolytic anaemia when treated by daily doses of primaquine.

The authors conclude (1) that primaquine has a very powerful effect on tissue stages of *P. vivax* during the incubation period; and (2) that weekly administration of 30 mgm. primaquine base combined with 300 mgm. chloroquine base may be of considerable practical use in controlling malaria among military personnel. *G. Covell*

Pinotti, M. Um novo método de profilaxia da malária: associação de uma droga antimalárica ao sal de cozinha usado na alimentação diária. [**A New Method of Malaria Prophylaxis: the Addition of an Antimalarial Drug to Cooking Salt used in the Daily Preparation of Food**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 5–12. English summary.

Residual spraying of houses with DDT has had remarkable success in Brazil in the control of malaria transmitted by any of the chief vectors, *Anopheles darlingi*, *tarsimaculatus*, *albitarsis*, *cruzii* and *bellator*. The overall decrease in malaria incidence effected by this measure is estimated as high as 95 per cent. In the coastal regions total elimination of malaria can be secured by two sprayings a year. In parts of the country, however, the method is not applicable. In parts of the central plateau *A. darlingi* attacks man and animals indiscriminately in the open air. In the west of the country the shelters under which primitive people live lack walls. Thirdly, in the west of the Amazon region and elsewhere the population is scattered and sparse and the means of communication almost non-existent, rendering DDT spraying impracticable or very costly.

To control malaria in these exceptional circumstances the author describes a scheme of adding chloroquine to the cooking salt supplied to the people for their daily preparation of food. Chloroquine was shown to remain unchanged if stewed for 3–4 hours at temperatures not exceeding 100°C. in media with a *p*H of 4–7. Porridge containing 45 mgm. of chloroquine base was given daily to each of 29 malaria patients in hospital; febrile attacks ceased and parasites disappeared from the blood. Twenty-four of these patients had been inoculated with blood containing *P. vivax* or *P. malariae*: 5 had naturally acquired infections, 4 *P. vivax*, 1 *P. falciparum*. The average intervals between the commencement of treatment and the disappearance of parasites from the peripheral blood were *P. malariae* 7 days, *P. vivax* 5 days, and 2 days in the one *P. falciparum* infection. Temperatures fell to normal in 4–5 days in *P. malariae* infections, 2–3 days in *P. vivax* infections and after one day in the *P. falciparum* infection. The treatment was continued for 30 to 40 days after the disappearance of parasites from the blood. One patient with *P. vivax* infection had a parasitic relapse 25 days after the end of treatment. All the others remained free from any sign of infection during a period of observation which extended to 4 months.

Another group of 33 persons were fed daily with this porridge containing chloroquine, starting 8 or 15 days before each was inoculated with blood containing either *P. malariae* or *P. vivax*. The treatment was continued for 1 to 3 months. None showed any sign of malaria infection: all those in a control group inoculated simultaneously suffered from attacks of malaria with high parasitaemia. Five persons who have taken this medicated porridge for 15 to 18 months have shown no sign of drug intolerance.

Cooking salt containing chloroquine diphosphate (30 mgm. chloroquine base in 10 gm. salt) is now being used exclusively in certain rural areas

where malaria is endemic. Here parasite rates have fallen sharply; they remain high in control areas. *Norman White*

Houel, G. & Donadille, F. Vingt ans de lutte antipaludique au Maroc. [**Twenty Years of Antimalaria Work in Morocco**] *Bull. Inst. Hyg. Maroc.* 1953, v. 13, Nos. 1/2, 3–51, 5 pls. (1 coloured), 3 maps (1 coloured on pl. & 1 folding), 1 graph & 2 charts. [30 refs.]

When Morocco became a French Protectorate in 1912 malaria, typhus fever, plague, smallpox and relapsing fever were scourges that had ravaged the country for centuries. In those early years epidemic control was a function of the military medical staff and an army medical malariologist had the task of initiating and controlling antimalaria measures. In 1928 a civil Public Health Administration was set up: in 1930 the Institute of Hygiene of Morocco was opened at Rabat and assumed the control and coordination of malaria-control work in the country. In 1940 the growing importance of the antimalaria work being undertaken necessitated a measure of decentralization. Regional Services of Hygiene and Epidemiology were responsible for malaria control in each of the 7 large administrative areas into which the country is divided but the technical guidance of these activities remained a responsibility of the Institute of Hygiene.

The present report describes in considerable detail the varying incidence of malaria and the development of control measures that have occurred from 1934 to the present time. The progress has been remarkable. Twenty years ago regions of high malaria endemicity covered a vast area and epidemic manifestations were frequent. Reclamation work, antilarval work around important centres of population, antimalaria medication and propaganda work had resulted in noteworthy improvement by 1939. During the war years progress was interrupted: relatively low malaria incidence in 1944 and 1945 was attributable to the exceptional dryness of those two years.

Residual spraying of dwellings with modern insecticides has not yielded results of much importance in Morocco. The lethal effect of DDT in Morocco does not last more than 3 months. Moreover the rural population is for the most part very scattered. The prophylactic distribution of synthetic drugs is hampered by the lack of cooperation on the part of the population it is desired to protect, but in the treatment of the disease the synthetic drugs that are effective in single doses rapidly control epidemic outbreaks in communities if 80 per cent. of the population at risk are so treated.

Recent agricultural development, a great increase in irrigation and the extension of rice cultivation, so important to the economy of Morocco, have increased malaria hazards, but the rigorous precautions that are taken have prevented any increase in malaria incidence attributable thereto.

During the last 5 years there has been a very noteworthy decline in malaria incidence towards which all the measures mentioned have contributed: moreover, meteorological conditions have been less than usually favourable to the transmission of the disease.

Antilarval measures occupy a more important place in the control programme than in most other comparable countries at the present time. *A. maculipennis labranchiae*, the chief vector, has such numerous and diverse breeding places, however, that a generalized antilarval campaign to eradicate the species is altogether impracticable.

[See also this *Bulletin*, 1951, v. 48, 1072.] *Norman White*

Bhombore, S. R., Sitaraman, N. L. & Nanjundaiah, K. S. **Effect of Lime on Residual Activity of D.D.T.** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 63–9, 1 chart.

In the course of routine applications of DDT in Mysore State, it was observed that the villagers frequently whitewashed their houses about the time of the spraying, in connexion with some religious function. To test the effects of limewash on the residual insecticidal effect of DDT, one village was selected for a trial. Half the houses were limewashed on the day following spraying; in another part of the village DDT was mixed with the limewash. A group of villages which had been normally sprayed with DDT without whitewashing and another group left unsprayed were used as comparison areas. The DDT was applied as a suspension prepared from 50 per cent. wettable powder to give 200 mgm. per sq. ft. in all cases.

The effects on the mosquitoes in the following two seasons were judged from the records of mosquito-catching stations. These showed irregular numbers in the unsprayed villages, but in all houses treated with DDT, whether limewashed or not, the numbers remained very low for nearly 10 months. [This does not necessarily imply that the mosquito population was reduced, but they were certainly prevented from resting in houses.]

The infant parasite rate in the untreated villages fluctuated between 1·6 and 8·3 per cent. during this period. In the sprayed villages there were no positive infant blood smears after the use of DDT. [Total numbers are not given.]

The limited data available suggest that limewash does not appreciably affect the efficacy of DDT residue. *J. R. Busvine*

Malaya, Federation of: Malaria Advisory Board. **Malaria Control by Modern Methods.** *Circular No. 7* (Revised). 1954, July, 31 pp., 1 diagram. [$0.50.]

The first edition of this circular was reviewed in this *Bulletin*, 1952, v. 49, 1098. There has been a number of advances in respect of both insecticides and antimalarial drugs during the last two years and in the revised edition the text has been very considerably expanded and in part re-written as the result of practical field experience.

As was emphasized in the abstract of the first edition the information contained in this brochure, though intended primarily for use in Malaya, will be found invaluable by field workers in all countries where malaria is a public health problem. *G. Covell*

Floch, H. La cinquième campagne de pulvérisations d'insecticides à effet remanent dans les habitations en Guyane française. Résultats de nos campagnes de dédétisation dans la lutte antipaludique (réduction massive de la malaria, conséquences démographiques et économiques, discussion), la lutte antiamarile (discussion) et la lutte contre les insectes en général (résistances, discussion). [**The Fifth Campaign of Insecticidal Spraying in the Dwellings of French Guiana. Results of DDT Spraying in the Antimalaria Campaign (Massive Reduction of Malaria, Demographic and Economic Consequences, Discussion), Anti-Yellow-Fever Campaign (Discussion) and the Campaign against Insects in general (Resistance, Discussion)**] *Arch. Inst. Pasteur de la Guyane Française. Publication No. 317.* 1954, Feb., 68 pp., 4 figs. [24 refs.]

The scope of this report is sufficiently detailed in its title. The DDT spraying campaign that was begun in May 1949 had as its ultimate aims

the elimination of *Aëdes aegypti* from French Guiana and so eliminating all risk of epidemic yellow fever, and the suppression of *Anopheles darlingi* in all inhabited areas of the territory, which would be tantamount to the elimination of malaria. The report of the fourth year's spraying [this *Bulletin*, 1954, v. 51, 348] showed that both these aims had been virtually attained. The fifth year's spraying began in June 1952, two months earlier than in preceding years, and the technique adopted was in all respects the same as in the fourth campaign. The population protected was 20,414 occupying 31,383 rooms in 7,168 dwellings. The examination of blood films in 1952 indicated that there had been a 98 per cent. reduction in malaria incidence compared with the mean of the three years 1946–48. Not a single case of pernicious malaria was noted during the year, an unprecedented experience in French Guiana. No malaria parasite was seen in blood examinations in the Pasteur Institute during the first three months of 1953. The natural increase of the population continues: annual natural decreases of the population were the rule before DDT spraying was started.

Norman White

Singer, I. **The Course of Infection with** *Plasmodium berghei* **in Inbred CF 1 Mice.** *J. Infect. Dis.* 1954, May–June, v. 94, No. 3, 237–40, 1 fig. [13 refs.]

The course of infection of the Keyberg 173 strain of *Plasmodium berghei* was studied in a specially inbred strain of white mice (Carworth Farms 1) kept under highly standardized conditions and infected intravenously with a constant inoculum. Sixty animals were used, and all died of the infection, the average survival time being 15 days. No prepatent period occurred, the parasites increased in number for 4 days, then declined slightly, to rise again slowly until the animal died. The course of parasitaemia was examined *vis-à-vis* the progressive anaemia and reticulocytosis. There is apparently a minor and inefficient crisis about the fifth day when not only parasites are destroyed in large numbers, but erythrocytes also are agglutinated, lysed and phagocytozed. On the fourteenth day, half the circulating red blood cells are mature, and half are reticulocytes—in other words the parasite has an equal chance to attack one or the other; in actuality, the parasite invades 41 per cent. of the reticulocytes and only about 1 per cent. of the mature cells. *P. C. C. Garnham*

Singer, I. **The Cellular Reactions to Infections with** *Plasmodium berghei* **in the White Mouse.** *J. Infect. Dis.* 1954, May–June, v. 94, No. 3, 241–61, 28 figs. on 7 pls. [18 refs.]

This paper presents an exhaustive study of the pathology of *Plasmodium berghei* in white mice, interpreted according to the North American school of thought [*cf.* Taliaferro and Mulligan, this *Bulletin*, 1938, v. 35, 25], and based on the examination of 40 five- to six-weeks-old animals infected with a standard inoculum and sacrificed in pairs at daily intervals for 16 days. The organs were fixed in Zenker-formol solution and sections were stained by the Maximow method. The normal histology of each organ is first described, and then the effect of the malaria infection is followed day by day. Some remarkable divergences from the usual pattern of mammalian malaria were revealed. Initially in the spleen, hyperplasia of the

white pulp is marked, but recession sets in and by the seventh day lymphatic growth in this organ comes almost to a standstill; on the other hand, erythropoiesis progressively increases, accompanied by the appearance of many mitotic figures. Phagocytosis is evident from the first day of infection, just as it is in the liver, where activation of the Kupffer cells and other littoral cells starts very early and becomes very intense at the 16th day: macrophage activity is in fact greatest in the liver. In Glisson's capsule there is an increasing infiltration of cells, first of a polyblast series and later of an erythropoietic nature. In the blood sinuses of both these organs accumulate large numbers of infected erythrocytes, which are clumped together or stuck to the vascular endothelium, the parasites themselves usually being in an advanced stage of schizogony. The polyblast transformation of lymphoid tissue is also seen in the lymph glands which undergo marked hyperplasia to make up for the peculiar loss of this function by the spleen. Phagocytosis is seen in the lungs and in the blood vessels of other organs. The adrenals showed a loss of lipid from the cells of the fascicular zone, from the eighth day onwards.

The paper is accompanied by 7 plates illustrating semi-diagrammatically the histopathology of the infection, and showing clearly the changing features of the cells concerned in phagocytosis and erythropoiesis.

P. C. C. Garnham

Zuckerman, A. & Yoeli, M. **Age and Sex as Factors influencing *Plasmodium berghei* Infections in Intact and Splenectomized Rats.** *J. Infect. Dis.* 1954, May–June, v. 94, No. 3, 225–36. [14 refs.]

Bartonella-free white rats were infected with standard doses of *Plasmodium berghei* (maintained by passage in white mice) and the resultant infections were compared in relation to age, sex, and presence or absence of the spleen (removed before infection) in the host. The infections were studied particularly in respect to density of parasitaemia, time of crisis, and mortality. In intact rats, the older the animal the less severe was the infection, but this change in reaction was not regular; it occurred chiefly at adolescence. This suggested that endocrine changes might be involved, and castration and ovariectomy were performed to test this hypothesis, with negative results. Sex had no influence on the course of infections, though the disease was less severe in females after parturition than in virgins.

The effect of splenectomy was more interesting. In the youngest age group, instead of increasing parasitaemia, removal of the spleen caused a marked diminution, the peak parasitaemia in rats with spleens being 74 per cent., and only 16 per cent. in those without the organ; also death was delayed in the latter group. Later experiments confirmed these results though the difference was not quite as great (35 per cent. compared with 23 per cent.). A further unsuspected feature of infections in young splenectomized rats was the absence of fulminating parasitaemias, so striking a phenomenon of infections in young intact animals. Ultimately, splenectomy always had an adverse effect, and at all ages; only a few survived and with one exception these belonged to the older age groups. The fundamental difference between splenectomized and intact animals is that once 20 per cent. of the erythrocytes are parasitized in the former the animals will invariably die; the intact will survive much heavier infections.

P. C. C. Garnham

Fabiani, G. & Fulchiron, G. Influence de la splénectomie sur la résistance naturelle et l'apparition de l'immunité au cours du paludisme expérimental du rat blanc. [**Effect of Splenectomy on Natural Resistance and the Appearance of Immunity during Experimental Malaria in the White Rat**] *C.R. Soc. Biol.* 1954, Mar., v. 148, Nos. 5/6, 530–33.

Forty-four white rats were splenectomized either before or shortly after infection with *Plasmodium berghei*. The rats as a rule weighed between 80 and 150 grammes and they were inoculated intraperitoneally with varying quantities of citrated, parasitized blood. Twenty-four rats were splenectomized before infection—from a few hours up to 14 days; all exhibited a normal course of parasitaemia, but unlike intact animals, none showed a crisis and all died (about half of unsplenectomized rats manage to survive). The same result was obtained in much older animals (up to 300 grammes in weight). The remaining 20 rats were splenectomized at different intervals after infection; again all died, but if the spleen was removed at the moment of crisis, the parasites diminished in number although death supervened in 2 days; if the spleen was removed in the post-crisis phase, there was a gradual increase in parasitaemia leading to death 3 to 17 days later. The authors concluded from these experiments that the spleen exerts no action early in the infection, when varying degrees of natural resistance influence the outcome, but later it is essential to the development of specific immunity, though other tissues play a minor part also. [See also Galliard and Lapierre, this *Bulletin*, 1952, v. 47, 1182; 1951, v. 48, 869.]

P. C. C. Garnham

Krishnaswami, A. K., Satya Prakash & Ramakrishnan, S. P. **Studies on *Plasmodium berghei* Vincke and Lips, 1948. XV. Acquired Resistance to Sulphadiazine.** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 9–18, 1 chart. [46 refs.]

This investigation describes the preparation of a strain of *P. berghei* resistant to sulphadiazine, and some of its characters. Resistant strains of the same parasite have also been described previously [this *Bulletin*, 1951, v. 48, 1086; 1954, v. 51, 148]. A more or less complete list of papers dealing with the subject of drug resistance in plasmodia is given in a table. The usual procedure was followed for making the strain in rats and mice resistant to the drug, namely administration of subcurative doses of drug during serial passage of the infection. The degree of resistance attained was 700- to 800-fold during a period of 63 weeks in which there were 39 passages. The resistance was unaltered during a series of 53 passages over a period of 9 months in absence of drug. Change of host from rat to mouse likewise did not affect resistance. The strain was sensitive to daraprim [pyrimethamine]. [The last finding was not in agreement with the results described earlier by one worker. The doses of drug quoted in the present paper to obtain the same therapeutic effect are very much lower than those in the earlier papers.]

J. D. Fulton

Baranger, P. & Filer, Mary K. Recherches sur un antagonisme entre le sarcome de Rous et la malaria aviaire. [**Studies on Antagonism between Rous Sarcoma and Avian Malaria**] Reprinted from *C.R. Acad. Sci.* 1954, v. 238, 2037–9.

The authors have noted that persons on regular quinine suppression in malarial areas seem to be less subject to cancer than others. This paper is

a preliminary report of the results of experiments with *P. gallinaceum* infections and the Rous sarcoma in 4-day chicks.

The figures for two sets of experiments are given, one group of chicks received 22 million parasites and the other 44 million. Controls received no parasites. All were injected with Rous sarcoma material, and sacrificed on the eleventh day. The animals with malaria developed less extensive lesions than those without malaria, and no metastases. Metastases were extensive in half the controls. *B. G. Maegraith*

Jaswant Singh, Chandrasekhar, G. R., Bami, H. L. & Ray, A. P. **Screening of Antimalarials against *P. gallinaceum* in Chicks. Part IV.** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 1–8. [15 refs.]

The methods of test employed in the present series of investigations have already been described [this *Bulletin*, 1953, v. 50, 683]. Quinine was chosen as standard and the activity of other drugs was related to the minimal effective dose [MED] of this substance. For each dosage regimen of drug 4 to 6 chickens were used along with an adequate number of controls. Six groups of compounds based on chemical constitution were tested and included dihydrotriazines (a member of this series was isolated by Carrington *et al.* [this *Bulletin*, 1952, v. 49, 362] as an active metabolite of proguanil). Other substances tested included substituted biguanides, substituted sulphides, thioureas and biurets, quinazolines, quinindenes and other miscellaneous substances, a total of 45 in all.

Some halogen analogues of dihydrotriazine mentioned above have proved more active than the original compound. Replacement of alkyl groups resulted in loss of activity. In general the biguanides tested were relatively inactive but N^1-*p*-sulphonyl phenyl-N^5-*p*-chlorophenylbiguanide was 8 times as active as quinine. The sulphides or thioureas included in the tests showed little or no activity and likewise the remainder of the substances tested.

J. D. Fulton

Greenberg, J. & Bond, H. W. **Resistance of a Pyrimethamine-Resistant Strain of *Plasmodium gallinaceum* to certain 2,4-Diaminopyrimidines and Related Compounds.** *J. Parasitology.* 1954, Aug., v. 40, No. 4, 472–5. [11 refs.]

It is known that a number of different plasmodial species made resistant to pyrimethamine (Daraprim) are also resistant to chlorguanide (proguanil, paludrine). It is likewise true that some strains resistant to proguanil are also resistant to pyrimethamine. This cross-resistance suggests a similar mode of action of the compounds involved.

A strain of *P. gallinaceum* made resistant to pyrimethamine has been tested against 7 diaminopyrimidines, including pyrimethamine, a diaminotriazine and proguanil in week-old chicks, which were inoculated intravenously with parasitized blood. Treatment was started a few hours before inoculation and continued twice daily for 4 days in groups of 5 chickens receiving a different dosage regimen. The degree of parasitaemia was determined on the fifth day after inoculation. The results showed that resistance to pyrimethamine did not always extend to related compounds. The degree of resistance was correlated with the activity of a drug against the parent strain of the parasite. It is suggested that resistance may be connected with the mode of attachment of certain substituents to the pyrimidine ring, and that when this property develops a concomitant change in the parasite takes

place, involving an " acceptor " molecule. Compounds closely related in chemical structure to pyrimethamine varied widely in their effect on the pyrimethamine-resistant strain of *P. gallinaceum*. The strain showed noteworthy resistance to proguanil and the diaminotriazine. *J. D. Fulton*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed*:—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

VAN DEN BERGHE, L. & LAMBRECHT, F. L. **Notes on the Discovery and Biology of** *Glossina brevipalpis* **Newst. in the Mosso Region (Urundi).** *Bull. Entom. Res.* 1954, Sept., v. 45, Pt. 3, 501–5, 8 figs. on 2 pls.

The authors have discovered *Glossina brevipalpis* in the Mosso region of the Urundi, an extension of the known geographical distribution of the insect: it occurs here in gallery forests along the bank of a river. Many puparia were collected in this forest in the dry season at places which are well above high water level, even during the rains. The trees in the breeding places were not generally evergreen, indeed, an evergreen forest island appeared to be avoided: many of the breeding spots were at the base of *Brachystegia* trees.

The authors' observations on the habits of the adult insect confirm for the most part what is known. Adults of both sexes rest on tree trunks and the lower branches of trees, most commonly between 6 and 12 ft. from the ground.

Over 1,000 male flies and nearly 200 females were dissected and examined for trypanosome infections in the proboscis or gut. The rate in the males was 5·7, in the females 10·1 per cent. [The higher rate in females might perhaps be explained on the reasonable hypothesis that they live a good deal longer than the males.] The trypanosomes have not yet been shown to be pathogenic to goats or domestic rodents. The salivary glands of several hundred flies were dissected and two infected insects were found. The authors " do not believe that this trypanosome is necessarily a polymorphic one ". *P. A. Buxton*

MACHADO, A. DE B. Révision systématique des Glossines du groupe *palpalis* (Diptera). [**A Systematic Revision of the** *palpalis*-**Group of Glossina**] *Companhia de Diamantes de Angola. Publicações Culturais No. 22.* Museu do Dundo. (Angola.) Subsídios para o estudo da biologia na Lunda. 189 pp., 107 figs. & 1 folding coloured map. [Numerous refs.] 1954. Lisbon.

As the author remarks, the present phase in the study of the taxonomy of *Glossina* has extended into the categories below specific rank. Systematics are becoming more and more fine and precise, and this defines the author's approach to the members of the *palpalis* group.

The present study is extremely full and detailed. The author records all the localities in which these insects occur within his area and maps them

point by point; and he gives full attention to other workers' data on geographical distribution more generally. The systematic work is based to a considerable extent on studies of the genitalia of which numerous very detailed drawings and also photographs taken in a uniform way are presented. The degree of variation is often shown by figuring a number of individual specimens, the locality of each of which is recorded.

The author concludes that the species described by NEWSTEAD as *fuscipes* must be regarded as distinct from palpalis which he uses in a restricted sense. One may tabulate the distribution of the subspecies of the two as follows:—

palpalis palpalis	Nigeria to southern Angola,
,, *gambiensis*	Senegal to Ivory Coast,
fuscipes fuscipes	Equatorial forest of Congo and gallery forests to north of it,
,, *martinii*	Basins of Lakes Tanganyika and Moero, and most of Valley of Lualaba,
,, *quanzensis*	Basin of Kasai; affluents of Lower Congo on South bank.

It is extremely difficult to assess fine work on systematics. It has certainly been recognized for some time past that what we have called *palpalis* was by no means uniform either in details of structure or in feeding habits, relation to environment and so forth.

Coming to the other members of the group, the author records *G. newsteadi*, the status of which has puzzled others, as a subspecies of *G. pallicera*. As to the other two members of the group, *tachinoides* and *caliginea*, he is content to leave their systematic status unchanged. Records of both of them from Angola are erroneous [and we are glad to see that stated]. *P. A. Buxton*

TRINCÃO, C., PARREIRA, F., FRANCO, A. & GOUVEIA, E. Variações da citoquímica leucocitária (lípidos, peroxidase e fosfatase alcalina) na doença do sono. [**Cytochemical Changes in the Leucocytes in Sleeping Sickness**] *Anais Inst. Med. Trop.* Lisbon. 1953, June, v. 10, No. 2, 189–95. [16 refs.]

The English summary appended to the paper is as follows:—

"The writers investigated qualitatively the variation in the lipid, peroxydase and alkaline phosphatase content of leucocytes in sleeping sickness.

"No gross variations from the normal have been detected regarding lipids and peroxydases, but the alkaline phosphatase seems to be increased."

PINTO, A. R. **The Therapeutic Effect on a Group of Sleeping Sickness Patients of a Single Injection of 3854 R.P. (Mel B Friedheim-Arsobal Spécia).** *Amer. J. Trop. Med. & Hyg.* 1954, May, v. 3, No. 3, 464–5.

Sixteen patients with trypanosomiasis (species of trypanosome not stated) were treated with a single injection of Mel-B (Friedheim). The dosage was calculated on a basis of 4 mgm. per kgm. body weight. The maximum dose given was 198 mgm. Violent but temporary abdominal pain in one patient was the only toxic effect noted. Trypanosomes were absent (presumably from the blood) after 24 hours, and from blood and gland juice one month later. After 4 months patients were clinically cured and trypanosomes

were absent. In all except one patient the protein and cell content of the cerebrospinal fluid had improved towards normal. Eight months after treatment clinical cure was maintained.

An eosinophilia which persisted for as long as a month in some patients was noted within 24 hours of treatment.

[Clinical details of patients are not given.] *B. G. Maegraith*

Médecine Trop. Marseilles. 1953, v. 13, Special No., 793–954. Études sur la trypanosomiase humaine africaine. [**Studies on African Human Trypanosomiasis**].

This special issue of *Médecine Tropicale*, devoted to African human trypanosomiasis and its prophylaxis, outlines certain aspects of the progress made recently in this field. In the introduction J.-H. Raynal enumerates a few historical facts regarding the disease. The account of the modest beginnings of what is now the Pasteur Institute at Brazzaville, and the long succession of world-famous workers associated with it who made an intensive study of the evolution of the human illness, is all too short. In the field of prophylaxis, the principles outlined by Jamot are still valid today. Great hopes, some of which have been fully realized, arose when the early results of prophylaxis with the diamidines became available, for in the early days prophylactic treatment of the healthy subject had not been contemplated. Continued effort has led to the optimistic belief that before very long sustained effort may suffice to make sleeping sickness but an unhappy memory.

P. Gallais deals with experimental trypanosomiasis, which like other syringe-propagated infections is not without its hazards but possibly not more so than the introduction of other new therapeutic agents. Whether credence be given to the spontaneous cure of *T. gambiense* infection by diet or to the inefficacy of all drugs, the author takes a middle course and states emphatically that human African trypanosomiasis, given the right treatment, is curable. In support of this the human inoculation experiments of Fairbairn [this *Bulletin*, 1933, v. 30, 765], Corson [*ibid.*, 1932, v. 29, 634; 1936, v. 33, 651] and Duke [*ibid.*, 1935, v. 32, 688] are cited. Precedents are quoted for the use of trypanosome infections, such as those of *T. cruzi* in cancer, by a number of authors as well as *T. gambiense* in general paralysis by Mesnil [*ibid.*, 1931, v. 28, (379)]. A different chain of events led the author to use experimental human infections with *T. gambiense* in treatment of certain severe mental illnesses. The value of electro-encephalograms is stressed. As a result of the employment of *T. gambiense* infections in the laboratory, much has been learnt about the evolution of the disease.

Gallais, Cros *et al.* provide more clinical details of a series of mental cases treated by experimental inoculation and describe the biological, electro-encephalographic and parasitological changes during experimentally induced trypanosomiasis. The general conclusions reached from a study of the infection following intravenous, intramuscular or intracutaneous inoculation of the infective agent are that the last method possesses distinct advantages in that it most closely resembles the course of the naturally acquired disease in its character. The first stage as studied seems to offer opportunities for therapy of the mentally ill comparable to that provided by malaria therapy.

A discussion by Gallais *et al.* follows on the different aspects of latency in human trypanosomiasis. The belief in the existence of an unknown

stage of the parasite is dwelt on at some length with reference to the corresponding problem in malaria in which a simple erythrocytic developmental cycle was first believed to take place. In view of the established tissue cycle in *T. cruzi* infections much has been written of similar stages in the other human and animal trypanosomiases. The authors themselves, like so many others, have observed in the cerebrospinal fluid and in dab preparations of pericardium, myocardium and lining of the third ventricle, free leishmanoid forms, but have never seen them in tissues. Their existence is, according to the authors, not in doubt, but the part which they play in an evolutionary cycle is still obscure. The belief in a latent form capable of development is supported by clinical evidence. By means of Nelson's test light has been shed on the false serological reactions encountered in syphilis occurring in the presence of African trypanosomiasis. It has value in determining the presence of encephalitis of mixed origin due to these two types of infection.

In the second part of the article the chemoprophylaxis of the disease is dealt with first of all by PILLE, who outlines briefly the history of the diamidines and their pharmacological properties with a description of their use in treatment of the animal and human disease. He considers that their prophylactic properties depend on their retention in the organism rather than on their affecting the host. He draws attention to the interesting fact that three substances, namely stilbamidine, propamidine and pentamidine, discovered early in the series of researches by EWINS and collaborators, are still the most potent of the series. The combination of pentamidine with Moranyl (Suramin, Bayer 205) seems to offer possibilities in prophylaxis. LAUNOY summarizes the results of his experiments on the protection of the rat against infection by *T. gambiense* by means of pentamidine. Such a result depends on the nature of the base used and is independent of resistance produced in the host tissues.

An interesting article by MASSEGUIN follows on the chemoprophylaxis of human trypanosomiasis. In this field attention may be devoted to the trypanosome, to the vector or to the reservoir of the virus—man. With the appearance of the diamidines the protection of man became possible, and the drug proved a powerful weapon in French hands. Theoretically, complete eradication of the disease appears possible but in practice insuperable difficulties, not the least being finance, may be encountered. Further data on the same subject by LOTTE emphasize these difficulties. The hope is expressed that the ideal of JAMOT, namely sterilization of the vector by attenuation of the infective agent, may be realizable. The final contribution by BEAUDIMENT and LEPROUX outlines the practical results of the extended use of pentamidine (lomidine) as a prophylactic in the French Cameroons.

The studies described in the above contributions provide a fitting and well-merited tribute to all French and other workers in Equatorial Africa who by their efforts and self-sacrifice have accomplished so much in the field of trypanosomiasis.

J. D. Fulton

UNSWORTH, K. **The Curative Effect of Ethidium Bromide against *Trypanosoma vivax* Infections of Zebu Cattle in West Africa, with Observations on the Toxicity of the Drug.** *Ann. Trop. Med. & Parasit.* 1954, Sept., v. 48, No. 3, 229–36, 1 pl.

UNSWORTH, K. **Further Observations on the Curative Effect of Ethidium Bromide against *Trypanosoma vivax* Infections of Zebu Cattle in West Africa.** *Ann. Trop. Med. & Parasit.* 1954, Sept., v. 48, No. 3, 237–41.

Geigy, R., Halff, L. A. & Kocher, V. L'acide folique comme élément important dans la symbiose intestinale de *Triatoma infestans*. [**Folic Acid as an Important Element in Intestinal Symbiosis in** *Triatoma infestans*] [Miscellanea] *Acta Tropica*. Basle. 1954, v. 11, No. 2, 163–6, 2 figs. [16 refs.]

The authors have applied microbiological methods to determine the vitamin B requirements of the symbiotic micro-organisms in the intestine of the Reduviid bug, *Triatoma infestans*. The symbionts were cultivated on different culture media, and it was found by qualitative tests that the symbionts require for their own metabolism the following members of the vitamin B complex: lactoflavin, nicotinic acid, pantothenic acid, biotin and pyridoxine. The authors state that the symbionts are therefore unable to place these vitamins at the disposition of their hosts. By contrast, the symbionts in culture can practically do without folic acid, vitamin B12, thiamine, choline, inositol, *p*-aminobenzoic acid and strepogenine, and these should be available for the needs of the host.

The metabolism of the symbionts, with a special emphasis on the rôle of the B vitamins, was studied by cultivating the symbionts on a semi-synthetic medium to which had been added defribrinized human blood and citrate. It was found that the symbionts synthesized thiamine, B12 and strepogenine in very small amounts, probably just enough for their own requirements. On the other hand, there was a notable hyperproduction of folic acid by the symbionts, about 2,500 times the amount required for their needs.

The authors regard this excess of folic acid as being of indispensable value to the host, especially as a controlling factor in post-embryonic development.

However, when normal and sterile bugs were fed artificially through a membrane on guineapig serum to which folic acid had been added, a general retardation of development and a reduction in number was observed. A control group fed on serum without folic acid showed an improvement in condition and development. The authors ascribe this surprising result to the fact that the quantity of folic acid added to the serum was too great (1 μgm. per cc.) and produced a reverse effect, even in sterile bugs. [This may perhaps also be explained by the fact that no other vitamins except folic acid were added to the serum and that the bugs were therefore deprived of certain other B vitamins which may be essential to them without the agency of the symbionts. It seems unlikely that folic acid alone will produce uniform growth and moulting, especially when one considers that the B vitamins in the serum are not present in high concentration and are almost certainly insufficient for the requirements of the developing bug.]

A brief description is given of the re-infection of sterile nymphs with symbionts by artificial feeding of a suspension of symbionts in serum, and also the effect of certain antibiotics on symbionts when added to a serum diet.

J. S. Harington

Nussenzveig, V. & Sonntag, Ruth. Xenodiagnóstico artificial. Novo processo. Primeiros resultados positivos. [**New Method of Artificial Xenodiagnosis**] Reprinted from *Rev. Paulista de Med.* 1952, Jan., v. 40, No. 1, 41–3, 1 fig.

The authors describe an improved method for the artificial xenodiagnosis of Chagas's disease. The procedure is as follows. An open cardboard box containing the bugs (in this case *Triatoma vitticeps*) is covered with gauze, and placed in a jar. About 10 ml. of the blood to be tested are collected

in a Borrel's cylinder [= staining jar], the mouth of which is covered with a piece of moistened cow's gut. After heating in a water-bath at 37°C. for 10 minutes the flask is inverted and placed in the jar, so that the membrane is in contact with the gauze of the box, enabling the bugs to feed on the blood.

It was demonstrated that artificial xenodiagnosis is superior to natural xenodiagnosis; moreover, when trypanosomes are scanty in the blood they can be detected more readily by this method than by blood culture and inoculation of laboratory animals. *C. A. Hoare*

Nussenzweig, V., Sonntag, Ruth, Biancalana, A., de Freitas, J. L. P., Amato Neto, V. & Kloetzel, Judith. Ação de corantes tri-fenil-metânicos sôbre o *Trypanosoma cruzi* " in vitro ". Emprêgo da violeta de genciana na profilaxia da transmissão da moléstia de Chagas por transfusão de sangue. [**Effects of Tri-Phenyl-Methane Dyes on** *Schizotrypanum cruzi*] *Hospital.* Rio de Janeiro. 1953, Dec., v. 44, No. 6, 731–44. [26 refs.] English summary.

A number of observers in Brazil have reported transmission of Chagas's disease in the course of blood transfusion. With the view to preventing such accidents, the authors have carried out experiments on the sterilization of blood infected with *Trypanosoma cruzi.* The drugs tested for this purpose were basic fuchsin, rosanilin (magenta I), malachite green, crystal violet, methyl violet, and gentian violet. Various amounts of these chemicals, mixed with blood taken from mice infected with a virulent strain of *T. cruzi*, were placed in the refrigerator, as in the case of blood banks. After different intervals of time the results were assessed by microscopical examination of the blood, and—if this was negative—by inoculation of mice.

The best results were obtained with gentian violet in a concentration of 1 in 4000, which killed the trypanosomes in the blood after exposure for 24 hours. The addition of this dye has no haemolytic action and in about 50 transfusions of 500 cc. of blood, to which 0·1 gm. of the dye was added, no toxic effect was observed. It is recommended that the blood of donors suspected of harbouring *T. cruzi* should be treated prophylactically with this amount of dye 24 hours before it is used for transfusion. *C. A. Hoare*

Perlowagora-Szumlewicz, Alina. A eficácia do expurgo domiciliário com hexaclorociclohexana no contrôle do vetor da doença de Chagas (a importância de alguns característicos biológicos dos triatomíneos no planejamento do ciclo de aplicação do inseticida). [**Efficacy of House-Spraying with BHC in the Control of the Vectors of Chagas's Disease and the Importance of Certain Biological Characteristics in Planning the Cycle of Spraying**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 63–100, 3 figs. [31 refs.] English summary.

The efficacy of house spraying with BHC for destroying *Triatoma infestans*, has been studied by a series of naturalistic trials. Seventeen small huts were constructed with low cement bases, mud walls supported by a wooden frame and thatched roofs; these were similar to human dwellings in the area harbouring Chagas's disease. These huts were artificially infested at various times with *Triatoma* bugs reared in the laboratory. Every night a caged hen was put in each hut to provide blood meals. The state of these small bug colonies was determined by daily inspections for dead bugs and at the end of each test the huts were dismantled and searched for living and dead insects. It was usually found that about 5 to 10 per cent. were

lost. Twelve of these huts were adjacent and these were covered with a wire mesh cage to exclude entry of stray bugs; these huts were used for the tests with BHC. The other 5 huts were used to study the natural mortality of the bugs in winter and summer.

In the first tests, the control huts were infested with 50 or 150 adults and 50 up to 500 fifth stage nymphs. These huts, dismantled after 1 to 6 months, gave evidence of high mortality in the first month (50 per cent. in winter and 70 per cent. in summer), while only 15 per cent. survived 4 months and 8 per cent. 6 months.

To test the residual powers of BHC, two huts were treated with sprays giving 0·5 to 0·6 gm. *gamma* BHC per sq. metre. After 2 and 3 months respectively, 20 adults and 20 nymphs were put into each and the final examinations were made a month later. The mortalities observed were 57·5 and 55 per cent., thus differing little from the controls; therefore, the BHC had no effect on adults and old nymphs at this time.

In two subsequent tests, bugs and nymphs were introduced in groups of 4 and 3 huts and observed for 2 months. The huts were then sprayed with *gamma* BHC (0·5 to 0·8 gm. per sq. m.) and then observed for 3 months before demolition. The first of these tests, done during the winter, showed 25 per cent. survivors after 1 month, falling to 5 per cent. 3 months after treatment. The analogous test in the summer showed only 2·5 per cent. survival after 1 month and only 1·1 per cent. 3 months after spraying.

The authors conclude that the better results of the insecticide in the second test were due to the higher natural mortality of bugs in summer. The effect due to insecticide was an increase of about 25 per cent. deaths, after 1 month, in each case.

A further test was made with a hut infested only 3 days before spraying, compared with one with a 2-month established colony. Both were sprayed with 0·5 to 0·6 mgm. *gamma* BHC per sq. m. and later dismantled. The recently infested hut was found to be completely disinfested while 11 per cent. survived in the established colony. It was considered that the difference might be due to the amount of restlessness of the *Triatoma* which would escape the insecticide if they remained in cracks and crevices. The use of pyrethrum spray to irritate the bugs was tried. It was found that this was more successful in an untreated hut, where 55 per cent. of the populations were driven out of their holes, than in huts treated with BHC, where only 20 to 27 per cent. were disturbed. However, pyrethrum is too ephemeral to be a suitable bug stimulant for ensuring contact with residual deposits.

To summarize: it was found that mortality (natural plus kill) following BHC spraying amounted to 85·8 per cent. of bugs after 2 months in winter compared with 97·5 per cent. in one month in summer. These figures refer to the adults and resistant older nymphs. Empty egg shells were often found, but the young bug nymphs are more sensitive and were practically always killed. *J. R. Busvine*

de Bustamante, F. M. & Gusmão, J. B. Sôbre a possibilidade de erradicação do *Triatoma infestans* com duas ou três aplicações domiciliárias de BHC. Resultado de uma prova de campo. [**Possibility of eradicating *Triatoma infestans* with Two or Three Applications of BHC to Houses. Results of a Field Test**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 101–13, 6 figs. English summary.

Tests were made in samples of 679 houses infested with *Triatoma* in 16 localities in the municipalities of Resendo and Itaverá, Rio de Janeiro. The

houses were divided into 3 groups: (I) 8 houses were sprayed once with BHC, (II) 28 houses were sprayed 3 times at 6-month intervals and (III) 28 houses were sprayed 3 times at 4-month intervals. The dosage of BHC (applied as a suspension from a wettable powder) was heavy, giving 1,000 mgm. *gamma* isomer per sq. metre.

Before the treatments and at intervals afterwards, the houses were dusted with a pyrethrum powder which drove the bugs out of their crevices. This method of assessing the bug population was confirmed in many cases by demolishing the houses and carefully searching for live *Triatoma*.

The results showed that BHC spraying is highly effective. Only one adult bug was found after treatment in one of the houses sprayed once only. In none of the houses sprayed several times was any live bug found, though many dead ones were discovered in those houses which were demolished. [The insecticidal effect of the pyrethrum powder used before and after treatment does not seem to have been taken into account.]

J. R. Busvine

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Taj-El Deen, S. D. & Al Alousi, K. **Kala-Azar in Iraq: Report of Four Cases.** *J. Faculty of Med., Baghdad, Iraq.* 1954, v. 18, Nos. 1/2, 15–19.

Iraq is not considered an endemic area for kala azar. The authors report 4 cases from the Children's Hospital, Baghdad.

The first patient was a child of 18 months who had suffered from fever for two months and oedema of the legs for one week. The child had a grossly enlarged spleen and a large liver, but no ascites; it had a " remittent fever of a moderate degree ". There was a generalized oedema and a few petechial haemorrhages mainly on the abdomen.

The white cell count was 200 per cmm. [*sic*] with 86 per cent. lymphocytes and no eosinophiles, and the red cell count 2,000,000 per cmm. with 30 per cent. haemoglobin. Spleen puncture showed *Leishmania donovani*. The plasma proteins were 6 grammes per cent. of which 4 grammes were globulin. The child died after two daily intramuscular injections of 1 ml. of solustibosan solution [strength not stated].

A second child of 2½ years was admitted in a moribund state and died. There was also oedema, a purpuric rash and enlarged spleen and liver in this case. The diagnosis was by sternal puncture.

The other two patients were children of 3 and 4 years respectively. No oedema or purpuric rashes were noted, but the other symptoms were the same and the diagnosis was also by sternal puncture. They are still under treatment.

[It is sincerely hoped that more will be reported about this apparently new endemic focus of kala azar. Oriental sore is endemic in Baghdad and there are few places in the world where the cutaneous and visceral forms of leishmaniasis both occur, although no really satisfactory explanation for this fact has been put forward. It would appear that kala azar is taking the acute haemorrhagic form as is usual when it appears in a new area. Extensive epidemiological investigation is certainly indicated if there is no question about the diagnosis.]

L. E. Napier

Denecke, K. & Pfannemüller, L. Über das Vorkommen von Kala-Azar im Irak. [**Kala Azar in Iraq**] *Arch. f. Hyg. u. Bakt.* 1954, Sept., v. 138, No. 5, 345–8.

Cutaneous leishmaniasis occurs epidemically in Iraq, but kala azar is said by the local physicians to be unknown there. Nevertheless the authors themselves came across 2 cases of visceral leishmaniasis in children, a proof that the disease does exist in Iraq; the 2 patients were a boy and a girl, each 1 year old. Professor Kirchmair in 1953 found 3 cases in Mosul, 410 km. north of Baghdad [reference not given].

Brief clinical notes of the authors' 2 patients are given. *L. donovani* were seen in material from spleen puncture in one and in the circulating blood and in sternal puncture in another. Both patients came from unhygienic surroundings, with clay-built dwellings in which were unplastered fissures and *Phlebotomus* hiding-places, and dogs, many of them ownerless and harbouring parasites, were allowed to wander about scratching in the garbage and associating with the inhabitants, although dog ticks did not reveal leptomonad forms on examination. Notes are included on leishmaniae and the different conditions to which they give rise. The authors put forward the view that the frequent occurrence of cutaneous leishmaniasis and the occasional cases of kala azar in children in the Mediterranean region on the one side, and the more frequent incidence of kala azar in adults in the Far East on the other, may be explained by inheritance, as well as by mutation, of an acquired resistance toward leishmania infections in the West and the still prevailing absence of such resistance in the East. *H. Harold Scott*

Chaoulitch, S. P. *Leishmania donovani* (Laveran et Mesnil, 1903) parasite aussi les érythrocytes. [*Leishmania donovani* **Parasitic in Erythrocytes**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 2, 244–6, 4 figs. on pl.

It is generally recognized at present that the leishmaniae parasitize cells of the reticulo-endothelial system exclusively, and that the alleged invasion of the erythrocytes by these parasites, described by some observers at the beginning of this century, was due to misinterpretation of LD bodies superimposed on red cells or lying in detached portions of the cytoplasm of RE cells. However, the author has examined stained smears of the bone-marrow, liver and spleen of kala azar patients, in which he claims to have frequently found erythrocytes parasitized by *L. donovani*. These findings are illustrated by photomicrographs. [But they lend themselves equally well to the conventional interpretation given above.] *C. A. Hoare*

Chaoulitch, S. P. Sur une reproduction multiple de *Leishmania donovani* (Laveran et Mesnil, 1903). [**Multiple Division in** *Leishmania donovani*] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 2, 246–8, 3 figs. on pl.

The author claims to have found in smears of the liver, spleen, bone-marrow and lung of an experimentally infected marmot evidence of multiple division in *Leishmania donovani*. Such division forms have the appearance of Koch's "blue bodies", which are illustrated in the accompanying photomicrographs. This form of reproduction is said to proceed as follows: the parent-leishmania first increases in size, the chromatin of the nucleus disappears while the kinetoplast becomes larger, and divides into a large number of daughter-kinetoplasts, around which the parental cytoplasm

condenses, giving rise to elongated daughter-leishmaniae, measuring 3–4 × 1 μ; finally the nucleus is re-formed in each parasite.

[This " multiple " reproduction of *L. donovani* appears to be purely imaginary, and cannot be accepted even on *a priori* grounds.] *C. A. Hoare*

Mirzoyan, N. A. [**Comparative Evaluation of Effectiveness of Antimony Compounds in the Treatment of Visceral Leishmaniasis**] *Med. Parasit. & Parasitic Dis.* Moscow. 1954, Apr.–June, No. 2, 161–4. [In Russian.]

Working in Uzbekistan, the author has carried out investigations on the comparative effectiveness of various antimonial drugs in the treatment of kala azar. For this purpose 1,074 patients were divided into 9 groups of similar ages (1¼ to upwards of 14 years) and with comparable clinical symptoms. Each group was treated by a different drug or method or both, the results of which—in the descending order of effectiveness—were as follows (dosage as stated in the original and average course in days are shown in brackets): (1) and (2) " solusurmin " (0·1–0·2 gm./kgm.: 10–12 days); (3) neostibosan (daily: 37 days); (4) " solusurmin " (0·05 gm./kgm.: 24 days); (5) neostibosan (every other day: 37 days); (6) " solusurmin " (0·02–0·03 gm./kgm.: 32 days); (7) stibosan (50 days); (8) " surmin " (62 days); (9) tartar emetic (72 days).

According to these trials, " solusurmin " proved to be the most efficacious drug for the treatment of kala azar, producing complete cure in all cases diagnosed early. Moreover, no instances of resistance to this drug were observed.

[" Surmin " (not to be confused with suramin) is the name for the Russian brand of stibosan, while " solusurmin " is equivalent to " solustibosan " or sodium antimony gluconate (BPC).] *C. A. Hoare*

Corradetti, A. Lotta contro la leishmaniosi mediante la lotta contro i flebotomi in Italia. [**The Control of Leishmaniasis through *Phlebotomus* Control in Italy**] *Rendiconti Istituto Superiore di Sanità.* Rome. 1954, v. 17, Pt. 5, 374–84, 3 figs. English summary.

Between 1948 and 1950 a large field experiment was undertaken to control leishmaniasis by spraying houses and stables with DDT to destroy *Phlebotomus*. The area chosen was a strip on the coast of the Adriatic (Abruzzo and Marche) where leishmaniasis was known to exist. Preliminary examinations of the inhabitants revealed some 3 per cent. of actual lesions and about 20 per cent. of scars of oriental sore among some 28,000 people. Three species of *Phlebotomus* were present in the area: *P. papatasi*, *P. perniciosus* and *P. perfiliewi*, of which the last was the most abundant and was considered the main vector.

Spray treatments of DDT at the rate of 2 gm. per sq. m. were given to all houses and stables in the area in the summers 1948 and 1949, and the spring of 1950. *Phlebotomus* were sometimes observed biting people in the open after the first treatment, but none was seen after the subsequent treatments. Further examinations of people for leishmaniasis were made after the treatments, each of the following figures being based on over 20,000 examinations from the experimental area and compared with about 2,500 people from adjacent untreated territory.

	Percentage of active cases			
	Before DDT	New cases observed		
	1948	1949	1950	1953
Treated zone ...	2·9	0·7	0·13	0·04
Control... ...	3·5	3·5	4·0	treated 1950

These figures are very encouraging and show that transmission of cutaneous leishmaniasis can be virtually eliminated by DDT spraying. It has already disappeared in malarious regions of Italy owing to anti-mosquito house spraying. Further investigations have shown that leishmaniasis is more widely distributed in Italy than formerly believed. (Distribution of oriental sore and kala azar in N. Italy are shown on a map.) These existing sites should prove amenable to DDT spraying. *J. R. Busvine*

Forattini, O. P. Nota sôbre criadouros naturais de flebótomos em dependências peri-domiciliares, no Estado de São Paulo. [**A Note on Natural Breeding Places of** *Phlebotomus* **in the Vicinity of Houses**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1953, Dec., v. 7, No. 2, 157–67, 1 fig. English summary (7 lines).

There are extremely few observations on the natural breeding places of any species of *Phlebotomus* anywhere in the Neotropical Region. Indeed, the author has only been able to find four references, and they do no more than describe the discovery of one or two larvae or pupae. One cannot say that the general breeding place of any tropical American *Phlebotomus* is yet known.

The present paper contains much detail of local interest. The author has succeeded on a single occasion in breeding *Phlebotomus intermedius* from some soil rich in organic material but this hardly justifies the conclusion that " these observations made in houses and its surroundings showed the presence of breeding places of *Phlebotomus intermedius* Lutz e Neiva, 1912 in piggeries ".

The paper gives details of large numbers of adult *Phlebotomus* of several species mostly captured at light with the aid of a Shannon trap in São Paulo, Brazil. There is a large excess of males over females, as has frequently been observed with other species of this genus captured at night. The commonest species appears to be *P. intermedius*. The author calls attention to the fact that adult *Phlebotomus* are particularly abundant in pigsties and says that on a number of occasions he has seen these insects [? species] sucking the blood of domestic pigs. *P. A. Buxton*

Nery-Guimarães, F. & de Bustamante, F. M. A aplicação domiciliária de DDT como base da profilaxia das leishmanioses. Estudo de um foco de leishmaniose muco-cutânea cinco anos depois da aspersão periódica com aquêle inseticida. [**House Spraying with DDT as a Basis of Control of Leishmaniasis. Study of a Focus of Muco-cutaneous Leishmaniasis 5 Years after such Spraying**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 127–30. English summary.

Early in 1947, one of the authors investigated an area in the Municipality of Mage (State of Rio de Janeiro) where leishmaniasis was prevalent. This

was a forested area with a high rainfall, considerable wild life and a scattered rural population. Of 306 persons examined, 48 bore ulcers and 39 were shown to be due to leishmaniasis (12·7 per cent. of the sample). In 12 houses, manual catching of *Phlebotomus* secured 132 specimens of *P. intermedius* (11·3 per house).

Shortly after this visit, the National Malaria Service started regular house-spraying operations with DDT, at 2 gm. per sq. metre. In 1953, after 5 years of DDT spraying, a second visit was made to the area. Clinical investigations were made on 296 persons from 74 houses. Ten persons were found with ulcers, but Montenegro intradermal tests showed that only one was due to leishmaniasis. A number of houses were searched for *Phlebotomus* (including the 12 found positive at the first visit) and, in addition, many were sprayed with pyrethrum to discover the presence of these insects; but none was found. Specimens of *P. intermedius* were found quite easily outdoors, however, within 20 metres of a house. This species is only semi-domestic and the action of the DDT may, perhaps, be repellent rather than lethal. In any case, the DDT seems to have suppressed leishmaniasis. *J. R. Busvine*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Weyer, F. Vergleichende Untersuchungen über das Verhalten verschiedener Rickettsien-Arten in der Kleiderlaus. [**Comparative Investigations into the Behaviour of Various Species of Rickettsiae in the Body Louse**] *Acta Tropica.* Basle. 1954, v. 11, No. 3, 193–221, 20 figs. [14 refs.]

The author has made an intensive study of the results of inoculation of various rickettsiae by different routes into certain arthropods. Several papers published by him in 1952–53 have already been reviewed in this *Bulletin* [1952, v. 49, 762 and 1036; 1953, v. 50, 22, 102, 499 and 923; 1954, v. 51, 165]. The substance of these papers and some further material have been incorporated in the present article which forms a comprehensive memoir on the subject.

The rickettsiae investigated were:— *Rickettsia quintana*, *R. prowazeki*, *R. mooseri*, *R. conori* (boutonneuse fever), *R. conori* (South African tick bite fever), *R. conori* (Kenya tick typhus), *R. rickettsi*, *R. akari*, *R. tsutsugamushi*, and *Coxiella* [*Rickettsia*] *burneti*. All of these, except *R. tsutsugamushi* and *R. quintana*, multiply or survive in the haemolymph of larvae of the meal-worm *Tenebrio molitor* and in the tick *Ornithodorus moubata*. Without exception they multiply in the haemolymph of the body louse and can be passaged through the lice by intracoelomic inoculation, though after a certain number of passages *R. tsutsugamushi* ceases to multiply in the coelom. Except *R. tsutsugamushi* all can multiply in the stomach of the louse when inoculated into the rectum. Except *R. tsutsugamushi* and *R. rickettsi*, all can be passaged repeatedly from louse to louse by rectal inoculation.

A useful table gives the comparative results of intracoelomic and rectal inoculation (into the louse) of all the rickettsiae that were studied, but

the author states that the differential features found in his studies cannot be relied on for the diagnosis of the various species till a number of strains of each have been tested. The paper is illustrated by 20 clear photomicrographs. *John W. D. Megaw*

Roger, F. Au sujet du diagnostic des rickettsioses : la fixation du complément, intérêt de certaines techniques. [**The Complement-Fixation Test in the Diagnosis of Rickettsial Diseases: Certain Technical Features of Interest**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 367–9.

The author states that crude unpurified rickettsial antigens can be employed with advantage in complement-fixation tests at titres at which they are still anticomplementary, provided that attention is paid to the haemolytic reactions. There is an optimum degree of dilution of the antigen and also of the complement; the dosage of the latter ought to be such as to give a constant rate of haemolysis of about 8–10 minutes with normal serum. When these conditions are complied with the specificity of the test is higher than with purified antigens because the whole range of the spectrum of the antigen is retained. There is also a pronounced increase in sensitivity associated with a procedure in which the antigen is diluted with the sole object of eliminating its anticomplementary action, which usually becomes negligible at serum dilutions greater than 1 in 10. *John W. D. Megaw*

Fuller, H. S. **Quantitative Comparisons of Responses of Cotton Rats and Albino Mice to Measured Doses of Epidemic Typhus Rickettsiae.** *J. Immunology.* 1954, Sept., v. 73, No. 3, 138–45. [17 refs.]

Experiments are described which were designed with the object of determining the relationship existing between the doses of viable rickettsiae of epidemic typhus needed (a) to cause an immediate lethal toxic effect in mice, with death within 24 hours; (b) lethal infection in cotton rats, with death within 7 days; (c) non-lethal immunizing infection in cotton rats. Three strains of *Rickettsia prowazeki* were tested, the Breinl, a Cairo and a Naples strain. The relationships indicated by the experiments were approximately as follows. One acute-toxic mouse LD50 is equal to 10^1 cotton-rat LD50 or to $10^{6\cdot5}$ cotton-rat ID50. One cotton-rat LD50 is equal to $10^{5\cdot5}$ cotton-rat ID50. A dose containing enough rickettsiae to kill 100 per cent. of mice by acute-toxic effect contains at least one lethal infective dose for cotton rats when administered by the intracardiac route.

These findings are regarded as having a practical application to the problem of estimating by challenge doses of infection the degree of immunity produced in cotton rats employed in testing rickettsial vaccines.

The numerous experiments that form the basis of the above estimates are described in detail and in highly technical language. Workers on immunology will wish to read the original paper. *John W. D. Megaw*

Schubert, J. H., Holdeman, Lillian & Martin, D. S. **Evaluation of certain Factors which affect the Titers obtained in the Weil-Felix Test.** *J. Lab. & Clin. Med.* 1954, Aug., v. 44, No. 2, 194–201, 1 fig.

In this paper, the authors clearly demonstrate the urgent need for a standardized technique for the Weil-Felix test.

Sera from 65 patients known or suspected of having typhus fever

[presumably murine typhus] were tested simultaneously by various technical methods in regular use in public health laboratories of the U.S.A. The antigen was a strain of *Proteus OX19* originally obtained from Dr. Felix.

The very great range of variation in the results observed is illustrated by the table below in which the titres observed in 5 cases of proved typhus fever tested by different techniques are shown.

Titres in Tests with Antigen Density, McFarland I

	Incubation time in hours		*Case 1*	*2*	*3*	*4*	*5*
	Water Bath	*Ice Box*		*Reciprocal of Dilution*			
At 37°C.	2	22	320	640	160	160	320
At 37°C.	24	0	640	640	320	160	640
At 52°C	2	22	640	160	80	160	320
At 52°C.	24	0	40	Neg.	Neg.	Neg.	160

The same sera tested simultaneously in similar conditions except that the antigen density was McFarland II reacted at lower average titres, and when tested with antigen density McFarland III the average titres were about one-half of those with density McFarland I.

The ranges of variation of the titres in the 12 tests of the same 5 sera were negative to 640 in 3 cases, 20 to 640, and negative to 160 respectively in the other two.

The most satisfactory technique was with antigen density McFarland II or III, and 2-hour incubation at 37°C. followed by refrigeration in the ice box for 20–22 hours. The antigen density McFarland I (the lowest density) gave a considerable number of false positive reactions in cases of other infections, whereas in the tests with the highest antigen densities 95·8 per cent. of 72 control sera gave negative results at a titre of 1 in 40, and positive reactions at this titre were obtained in 91·8 per cent. of 36 sera of proved cases of typhus; the incubation in controls and proved cases was as recommended above

The authors' findings strongly support the recommendation by Felix that the serological tests for the diagnosis of typhus fevers should be standardized [see this *Bulletin*, 1951, v. 48, 26]. *John W. D. Megaw*

Sato, K. **On the Results of some Liver Function Tests in Tsutsugamushi Disease.** *Acta Med. et Biologica.* Niigata. 1954, Mar., v. 2, No. 1, 397–407, 5 figs. [10 refs.]

Repeated liver function tests were carried out in 11 cases of tsutsugamushi disease caused by inoculation and in 2 cases of natural infection.

In the 11 inoculated patients the results were as follows. With the turbidity test of Kunkel and Hoagland [*Bull. Hyg.*, 1946, v. 21, (726)] all the patients showed a pronounced rise from the preinoculation figure which averaged 8·9 to an average titre of 13·6 which was reached about a week after defervescence. In 3 cases tested 3 weeks after defervescence the average titre was 20·2. Among healthy Japanese persons the normal upper limit is stated to be 12. The Takata reaction remained normal in all the cases till 7 days after the onset, but a week after defervescence it became definitely positive in 2 cases which, when tested 13–26 weeks after the attacks, were found to be negative. The Weltmann reaction became positive in 4 of the 11 cases a week after the onset, but a week or so after defervescence they were negative. Urinary urobilin and urobilinogen increased or appeared for

the first time on the 4th or 5th day of the fever, remained elevated for an average period of 8·6 days, and returned to the original level 4–5 days after defervescence. In the two cases that occurred naturally the findings were of the same general type.

The responses to the Kunkel and Takata tests were regarded as being associated with the development of immunity, and the Weltmann reaction seemed to indicate the occurrence of an inflammatory process in the body. The duration of the fever in the above cases was 7–10 days; it was shortened by the administration of the customary antibiotics.

John W. D. Megaw

Terada, H., Yamaguchi, S., Nose, H. & Arakawa, H. **Blood Findings in Tsutsugamushi Disease with particular reference to the Total Number of White Blood Cells and Blood Picture.** *Acta Med. et Biologica.* Niigata. 1953, Dec., v. 1, No. 3, 275–89, 3 figs. [19 refs.]

Repeated blood cell counts and other tests were made in 42 cases of tsutsugamushi disease (scrub typhus); 25 of the patients had been naturally infected in Japan, the other 17 had been experimentally inoculated for the treatment of neurosyphilis.

The total leucocyte count fell below 6,000 per cmm. in every case; in the naturally infected patients the lowest observed counts ranged from 1,300 to 5,400 and in 5 cases they were less than 2,000; in the inoculated patients the range was from 2,400 to 4,600 per cmm. The lowest count was usually observed during the height of the fever, but sometimes it occurred during defervescence. In the inoculated patients the fall in the count began 2–6 days after inoculation in 12 of the 15 cases observed during this period.

The authors believe that the leucopenia furnishes a strong basis for the differential diagnosis of the disease from other rickettsioses. The return towards normal of the total count usually commenced on the first or second day after defervescence and in 33 per cent. of the cases there was a slight temporary leucocytosis a few days later.

The curve of fall and rise of the total lymphocyte count ran parallel to that of the total leucocyte count except that the rise towards normal started earlier and was steeper, being associated with a temporary lymphocytosis in early convalescence in most of the cases. The neutrophile leucocytes also became reduced in numbers but their percentage rose from the onset to the acme of the fever and then fell to normal in the stage of defervescence; it continued to fall during the period of temporary increase in the lymphocytes but soon again returned to normal.

The eosinophiles disappeared at the onset and reappeared during, or a day or two after, defervescence. The monocytes showed no pronounced change except in 9 cases in which they rose to 10–17 per cent. during defervescence and convalescence.

No consistent changes were found in the red-cell count or in the haemoglobin content.

In 8 cases the thrombocytes fell to 26,500–50,000, in 17 cases to 50,000–100,000; only 25 patients were tested. *John W. D. Megaw*

Terada, I., Tsukada, K., Ōmori, I., Shimada, S., Inoue, M. & Shiramizu, R. **On the Red Cell Sedimentation Rate in Experimentally Inoculated Tsutsugamushi Disease (Scrub Typhus).** *Acta Med. et Biologica.* Niigata. 1954, Mar., v. 2, No. 1, 423–6.

In 12 cases of tsutsugamushi disease caused by inoculation with a Pescadores strain of *Rickettsia tsutsugamushi* the red cell sedimentation

rate was tested by the Westergren method at the following stages of the experiment:—(a) before inoculation, (b) during the incubation period, (c) during the rise of temperature, (d) at the height of the fever, (e) during defervescence, which was precipitated by antibiotic treatment, (f) one week after defervescence, (g) two weeks after defervescence.

The rates at these stages are shown to the nearest whole number.

	a	b	c	d	e	f	g
Average ..	13	13	20	25	23	40	35
Range	3–33	3–36	3–63	7–64	5–73	20–74	12–61

In 6 cases tests were made three weeks after defervescence; the average rate was 37 and the range 4–60. In 4 cases the test was made four weeks after defervescence, the average was 23, the range was 9–48.

Although in most cases the maximum acceleration of the sedimentation rate was reached during, or soon after, defervescence there were some cases in which the acceleration was less during defervescence than at the height of the fever or after defervescence. The wide range of variation at every stage and the capricious fluctuations in individual cases are not explained.

John W. D. Megaw

Prezyna, A. P., Chang Teh-Ling, Wang-Tsu-Lin, Dougherty, W. J. & Bond, H. B. **Treatment of Scrub Typhus in the Pescadores Islands with Chloramphenicol, Aureomycin and Terramycin.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 608–14.

The authors describe the results of treatment of 47 confirmed cases of scrub typhus in the Pescadores. The patients were members of the Chinese Nationalist army.

Among 25 patients treated with chloramphenicol [chloromycetin] the average duration of the fever after the first dose was 40 hours; 5 of the patients relapsed 5–7 days after the first dose was given; this was 4, 6, 7, 7 and 20 days respectively after the onset of the fever.

Among 12 patients treated with aureomycin [chlortetracycline] the average duration of the fever after treatment was 48 hours; 2 relapses occurred 4 and 5 days respectively after the first dose which had been given in each case on the 5th day of the fever.

In the 10 cases treated with terramycin [oxytetracycline] the average duration was 49 hours after treatment; 2 relapses occurred on the 4th and 5th days after treatment which had been given on the 4th and 2nd days respectively of the fever.

The usual course of treatment with each of the drugs was an initial dose of 3·0 gm. followed by a second dose of 2·0 gm. after 12 hours. Relapses were generally treated by doses of 0·25 or 0·5 gm. every 6 hours till a favourable response was obtained; the total dosage needed was 3·0–5·0 gm. except in two cases in which it was 1·0 and 2·0 gm. respectively.

There were no deaths; among untreated cases in previous outbreaks the fatality rate had been about 7·0 per cent. and the usual duration of the fever had been 22–38 days. *John W. D. Megaw*

Traub, R., Newson, H. D., Walton, B. C. & Audy, J. R. **Efficacy of Dieldrin and Aldrin in Area Control of the Chigger Vectors of Scrub Typhus.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 429–35. [24 refs.]

Experiments done in Malaya in 1948 and 1949 [unpublished] had shown that dieldrin, aldrin, chlordane, toxaphene and lindane were very promising

in the control of *Trombicula akamushi* and *Trombicula deliensis*, the vectors of scrub typhus. The investigations reported in the present paper were undertaken by the authors in North Borneo to test the efficacy of dieldrin and aldrin against chigger mites in the field. Estimates of chigger populations in 3 areas were made before and after the experiment by (1) trapping *Rattus rattus* and *R. mülleri* naturally inhabiting the areas and counting the number of chiggers on them, and (2) releasing laboratory white rats and wild-caught *R. rattus* and *R. mülleri*, free of chiggers, into a 50 ft. × 50 ft. section enclosed by an electrified fence in the centre of each plot. The bait animals were kept overnight and the next day the number of chiggers on them was counted.

After estimating the chigger populations in all the 3 areas, one plot was sprayed with dieldrin (containing 1·5 pounds of the insecticide to the gallon) and the second plot with aldrin (2 pounds to the gallon). They were applied at the rate of 2½ pounds of the insecticide (technical grade) to the acre. The third plot was kept as a control. The 2 species of chiggers found on rats in these areas were *T. deliensis*, a known vector of scrub typhus, and *T. wichmanni*.

Within 3 days after spraying there was a very marked reduction in the number of chiggers in the treated areas, an average of 3 per rat in the dieldrin-treated area and 11 per rat in the aldrin-treated area as against 850 chiggers per rat in the control area. Dieldrin was found to be more effective than aldrin as, even after 5 weeks, in the control area there were 75 times as many chiggers as in the dieldrin-treated area and 25 times as many as in the aldrin-treated one. There was no evidence that these chemicals were harmful to plants.

In their discussion the authors point out that despite the dense vegetation making it difficult for the insecticides to reach the ground, and the heavy rainfall which diluted them to a certain extent, dieldrin and aldrin had a residual effect lasting at least 8 weeks. The sustained low chigger populations indicated that they were effective against all stages of the mites. A reduction in the numbers of *T. akamushi* and *T. deliensis* has been definitely correlated with a reduced incidence of scrub typhus and the authors recommend that whenever susceptible persons are exposed in endemic areas the terrain be disinfested by the application of dieldrin or aldrin. *M. G. R. Varma*

Chang, R. S. M., Murray, E. S. & Snyder, J. C. **Erythrocyte-Sensitizing Substances from Rickettsiae of the Rocky Mountain Spotted Fever Group.** *J. Immunology.* 1954, July, v. 73, No. 1, 8–15. [12 refs.]

The authors describe further studies of the erythrocyte-sensitizing substances (ESS) obtainable from rickettsiae of the fevers of the typhus group; they have already described the method of extracting these substances which was worked out by Chang and the technique of employing them in a specific agglutination test for the presence of rickettsial antibodies in the sera of typhus patients [see this *Bulletin*, 1953, v. 50, 613]. An improved method is now described of preparing the substances in a purified form from the following rickettsiae:—*Dermacentroxenus* [*Rickettsia*] *rickettsi*, *Rickettsia akari*, *R. conori*, *R. pijperi*, *R. prowazeki* and *R. mooseri*. Infected yolk sacs were suspended and purified by extracting with ether which eliminated most of the non-specific and haemolytic substances contained in the preparation and greatly increased the yield of the ESS.

Human erythrocytes sensitized by ESS from *R. rickettsi*, *R. conori* and *R. akari* were equally agglutinable at high titres by sera of persons suffering

from Rocky Mountain spotted fever, boutonneuse fever or rickettsialpox. The reaction became positive 7–11 days after the onset of the fever. Simultaneous complement-fixation tests of the same sera gave reactions at far lower titres or completely negative responses.

ESS prepared from *R. mooseri* sensitized erythrocytes to agglutination by the sera of 2 out of 20 patients who had Rocky Mountain spotted fever.

Rabbits immunized against the above rickettsiae reacted to the test in the same way as human patients but immunized guineapigs gave very irregular reactions.

The ESS test was found much more satisfactory than the Weil-Felix test in cases of Rocky Mountain spotted fever and rickettsialpox. The latter test was negative in 3 of 5 cases of rickettsialpox and positive at only 1 in 10 in the other two. In 18 cases of Rocky Mountain spotted fever the Weil-Felix test was negative in 4 and positive at titres of 1 in 40 or less in 4 others. In the 10 cases in which it was positive at 1 in 80 or over the *OX19* titres were higher than the *OX2* in 6 cases and the reaction was never definitely of the *OX2* type.

Among 336 control cases of various types 9 gave unexplained reactions with ESS for Rocky Mountain spotted fever, rickettsialpox and boutonneuse fever; the titres were relatively low in most cases. One of the positive sera may have been from an undiagnosed case of rickettsialpox and 2 were from workers in a factory where 2 cases of rickettsial pox had been reported.

The test is claimed as having the advantages of great sensitivity and economy of material; the ESS keeps well for a year and it could easily be supplied from a central laboratory. *John W. D. Megaw*

Wolff, J. W. & Kouwenaar, W. Een onderzoek naar het vóórkomen van Q-koorts in Nederland. [**Does Q Fever occur in the Netherlands?**] *Nederl. Tijdschr. v. Geneesk.* 1954, Sept. 25, v. 98 (iii), No. 39, 2726–32. [18 refs.]

The English summary appended to the paper is as follows:—

" Q Fever, an infection caused by Coxiella burneti, is endemic in several European countries (Southern Europe, Switzerland, Germany, France, England). As infected material may easily be imported into the Netherlands, an investigation into the occurrence of the disease in this country seemed indicated.

" Not a single instance of C. burneti infection has been established in the course of the investigation, which included the examination of thousands of sera from patients or healthy subjects working in industries which are known to favour the spreading of the infection, as well as hundreds of bovine sera. The work should be carried on in view of the continued threat of import of infectious material."

Carrère, L. & Roux, J. Recherches sur la fièvre Q dans la région montpelliéraine. [**Studies on Q Fever in the Montpellier Region**] *Ann. Inst. Pasteur.* 1954, Oct., v. 87, No. 4, 460–62.

The authors investigated the incidence of Q fever in man and animals in the Montpellier region in 1952–1954. Sera were taken from persons suspected clinically of having rickettsial infections and from sheep and goats in the same neighbourhood and animals having had frequent abortions but whose sera were negative for brucellosis. The complement-fixation test was used and a titre of 1 in 64 was taken as positive. In 1953, 4 cases were

found among 31 persons, all of whom had some association with animals. In 1954, there were also 4, but in these there was no such definite history and it is suggested that in some infection was airborne in dust, particularly during the strong winds in the Spring.

In 1952–1953, sera from 388 sheep (27 flocks) were examined and 22 (from 3 flocks) were positive.

The authors note that two animal foci of Q fever exist, one 80 km. northwest of Montpellier, in a hilly region with many sheep, and the other 30 km. northeast in flat country where sheep are fairly numerous. Human cases are widely dispersed and are not always associated with animal foci. The variety and wide area of incidence of clinical cases in the region suggest that there are many inapparent or aborted cases and for investigation of this point a systematic serological survey would be necessary. *H. J. O'D. Burke-Gaffney*

Bock, Marianne. Experimentelle Untersuchungen zur Epidemiologie des Q-Fiebers. [**Experimental Investigations into the Epidemiology of Q Fever**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1954, July, v. 5, No. 3, 348–55, 4 figs. [20 refs.]

The chief feature of this paper is a description of a histological study of the kidneys of mice and golden hamsters experimentally infected with Q fever. Rickettsiae were seen in sections of the kidneys of 3 out of 18 mice and of 56 out of 85 hamsters. The latter animals were found specially susceptible, and increasingly so with progressive subinoculation of infection. Macroscopical changes in the organs were insignificant, but there was striking evidence of toxic degenerative changes in the epithelial cells of the tubules and in the endothelial cells of the intertubular and glomerular capillaries, especially in the case of the hamsters. The cell changes sometimes amounted to vacuolation of the swollen cells in which the rickettsiae were readily seen. Special interest was attached to the presence of colonies of rickettsiae in the vacuolated epithelial cells of the pelvis of the kidneys of some of the hamsters. These findings, in conjunction with the recovery of rickettsiae from the urine of the animals, strongly supported the view that urine of infected animals may play an important part in the transmission of infection, by contact, by droplet infection, or by inhalation of dust resulting from the drying of substances contaminated by infected urine.
John W. D. Megaw

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Galindo, P., Carpenter, S. J. & Trapido, H. **The Taxonomic Status of the *Aedes leucocelaenus* Complex with Descriptions of Two New Forms (Diptera, Culicidae).** *Ann. Entom. Soc. of America.* 1952, Dec., v. 45, No. 4, 529–42, 21 figs. on 3 pls.

What has been called *Aëdes leucocelaenus* has a very wide range in the American tropics from Panama to Argentina. It is held to be one of the

two main vectors of jungle yellow fever. The present authors, dissatisfied with the identification of material from Panama, have gone generally into the systematics of what appears to be a group of closely related forms. They conclude:—

"The present status of the *leucocelaenus* group of species, in our opinion, is then as follows:

"1. There is one species of the complex extending from Costa Rica, along the east coast of South America, to Argentina. This species breaks up into two subspecies at the extreme ends of its range, namely *Aëdes leucocelaenus leucocelaenus* Dyar and Shannon occurring in southern Brazil and Argentina and *Aëdes leucocelaenus clarki* n. ssp. which has been found in Panama and Costa Rica.

"2. In Territorio do Acre, on the eastern slopes of the Andes, there is a distinct species which we are describing in this paper as *Aëdes leucophoebus* n. sp., which may be separated from the true *leucocelaenus* on larval, pupal and male terminalia characters.

"3. In Panama and Costa Rica, besides *Aëdes leucocelaenus clarki* n. ssp. there also occurs another species, namely, *Aëdes leucotaeniatus* Komp which may readily be separated from other species of the complex by larval, pupal, female and male terminalia characters.

"4. The male illustrated by Komp (*loc. cit.*) without definite locality neither corresponds with the topotypical males of true *leucocelaenus* in our collection, nor with the two new forms described in this paper. Komp has informed us (in a letter to H.T. dated April 18th, 1951) that this illustration was drawn from a male taken at Restrepo, Colombia, and that a comparison of males, larvae and pupae from Restrepo, with material and figures of *Aëdes leucocelaenus*, ss. pp. *Aëdes leucotaeniatus*, and *Aëdes leucophoebus* n. sp. reveals that the Colombian form is distinct, representing the fifth member of the complex. This new species will be described by Komp separately."

P. A. Buxton

Collias, N. & Southwick, C. **A Field Study of Population Density and Social Organization in Howling Monkeys.** *Proc. Amer. Phil. Soc.* 1952, Apr., v. 96, No. 2, 143–56, 2 maps. [15 refs.]

The howler monkeys (*Alouatta* of several species) are probably more easily counted in the field than any other Primate. One can, moreover, readily distinguish males and females so that one may go some way towards an analysis of population. The colonies of these monkeys on Barro Colorado Island, in the Gatun Lake on the Panama Canal, are in a nature reserve and isolated by water so that they are probably easier to study than any other communities. Howler monkeys are susceptible to yellow fever and it is known that large numbers may die from that infection under natural conditions though some survive and show evidence of immunity.

On Barro Colorado Island there is a large number of groups or parties of howlers each keeping rather apart from the others and tending to inhabit a particular area of forest. The number of individuals in a group, including infants and juveniles, is generally less than ten. The monkeys were counted in 1932 and 1933 by Carpenter who found totals of 403 and 495. The present authors found that in 1951 the population was about 237. They publish information as to the sex-ratio, proportion of young and so forth in the different groups and a map showing the position occupied by each group on the island, the total area of which is a little over 6 square miles entirely covered with forest. The paper includes a discussion on the

possible causes of the lower population of 1951, which may be related to the wave of yellow fever that had by then passed through the Republic of Panama. *P. A. Buxton*

Smith, J. H. **Encephalitis in an Infant after Vaccination with 17 D Yellow Fever Virus.** [Memoranda.] *Brit. Med. J.* 1954, Oct. 9, 852.

In the case now reported the patient, a 5-weeks-old baby girl, developed signs of a nervous reaction 11 days after her inoculation with 17D virus vaccine, a reaction ushered in by convulsions which, at first occurring at 5- to 10-minute intervals and later becoming more severe and frequent, occasioned her admission to hospital on the 13th post-vaccination day. On the day of admission the temperature was 101·8°F., the anterior fontanelle was tense, there were fits at 10-minute intervals mainly involving the right side of the body and face, as well as some generalized convulsions involving the arms and legs; laboratory investigation showed the cerebrospinal fluid to be clear and colourless and not under pressure, with a cell count of 117 per cmm. (polymorphonuclears 40 per cent., lymphocytes 60 per cent.). The course of illness until complete recovery was as follows: on the 14th post-vaccination day the temperature was 100–101°F.; the convulsions persisted despite appropriate treatment; on the 15th day the temperature dropped to 99°F., the convulsions were controlled, the fontanelle was bulging, some neck rigidity was present but no papilloedema; on the 16th day the temperature was normal, and slight twitching occurred only when the baby was disturbed; thereafter the temperature remained normal, and by the 23rd day only occasional athetoid movements were noted; by the 32nd post-vaccination day when discharged from hospital, the child was normal. Treatment was with sulphadiamine, penicillin and streptomycin.

The author suggests two possible explanations of the occurrence of this case: either increased neurotropic affinity of the virus in spite of limited serial passage or a hypersensitivity to such prophylaxis in small infants which is not found in adults. [The case under review is the first recorded occurrence in England of menigo-encephalitis associated with the use of 17D virus vaccine as the sole prophylactic; 2 previous cases in Britain, associated with the inoculation of this type of vaccine 3 and 13 days respectively after primary smallpox vaccination have, however, been referred to by Dick and Horgan (this *Bulletin*, 1953, v. 50, 403). As to the first of the author's two possible explanations of occurrence, it can be stated that the vaccines associated with the development of meningo-encephalitis in the case just described and in the 5 French cases referred to in the author's paper were all prepared from the first passage in eggs from tested seed virus and not from virus which had gone through serial passage in eggs.] *G. Stuart*

i. Haas, L. **Encephalitis after Yellow-Fever Vaccination.** [Correspondence.] *Brit. Med. J.* 1954, Oct. 23, 992–3.

ii. Scott, L. G. ————. *Ibid.*, Nov. 6, 1108.

i. The correspondent refers to Smith's letter [above] and reports another case in an infant of 13 weeks who, 11 days after yellow-fever vaccination, was admitted with a history of irritability, pyrexia and drowsiness of 48, 18 and 6 hours' duration, respectively.

Neck stiffness and bulging fontanelle were present and Kernig's sign was positive. The cerebrospinal fluid, with a pressure of 205 mm., showed

460 cells per cmm., 120 mgm. protein per cent. and 60 mgm. sugar per cent. The fluid and blood cultures were sterile. Intrathecal penicillin on admission was followed by systemic penicillin, streptomycin and sulphafurazole [Gantrisin] for 10 days. Meningeal irritation disappeared in 24 hours and the temperature was normal in 4 days. Recovery was complete and uneventful. The author considers that neurotropic affinity of the yellow-fever virus " perhaps limited to infants " seems a very likely cause of this aseptic meningo-encephalitis.

ii. A similar case is described in a boy aged 8 weeks who had received 17D virus vaccination in Nigeria about a week before arriving in England. The date of admission to hospital is evidently incorrect: however, this is corrected in the *Brit. Med. J.*, November 13, p. 1180, from which it is clear that the incubation period of the encephalitis after vaccination was 18 days.

H. J. O'D. Burke-Gaffney

RABIES

Remlinger, P. & Hadji, A. Inoculation du virus rabique Flury dans la chambre antérieure de l'oeil du lapin. [**Inoculation of the Flury Strain of Rabies Virus into the Anterior Chamber of the Eye of Rabbits**] *Ann. Inst. Pasteur.* 1954, Sept., v. 87, No. 3, 334–5.

The authors have already shown that the Flury strain has a low virulence for rabbits and produces a great diversity of manifestations after intracerebral inoculation [this *Bulletin*, 1954, v. 51, (169)].

They have now inoculated 12 rabbits in the eye with equal amounts of a suspension of infected guineapig brain. Two animals showed no symptoms and were alive and well after 2 months. Seven showed violent epileptiform convulsions on the 9th to the 11th days. In 3 cases, these animals settled down after a few days and remained well during the following 2 months. In the other 4 the animals became weaker and died in 2 or 3 days: guineapig passage was positive in 3 cases and negative in one. Another rabbit developed an unsteady gait after 11 days and died 5 days later, without actual paralysis. One animal showed a peculiar somnolence after having appeared to be well for 12 days: for 3 days thereafter it appeared to be asleep, though no other abnormalities were noted, and it then died; guineapig passage was positive. Evidently intraocular inoculation in the rabbit showed as diverse changes as did intracerebral inoculation. Smaller doses were without effect.

H. J. O'D. Burke-Gaffney

Lôbo, B. A. & de Góes, P. Presença de glicoproteínas reveladas por técnica histoquímica em corpúsculos de Negri de bovinos. [**Presence of Glycoproteins in Negri Bodies in Bovines detected by Histochemical Methods**] *Anais Microbiol.* Rio de Janeiro. 1952–53, v. 2, 43–8, 5 coloured figs. on 2 pls. [19 refs.]

The English summary appended to the paper is as follows:—

" The McManus technique used to detect glycoproteins was employed in nervous tissues from rabic bovines rich in Negri bodies. In the sections subjected to the above technique the following aspects are seen: (a) small Negri bodies without glycoproteins; (b) Negri bodies composed exclusively of glycoproteins with a homogeneous structure; (c) Negri bodies with

heterogeneous structure composed of a central portion of glycoproteic nature and an external band not glycoproteic; (d) Negri bodies with the last feature (c) but presenting in the matrix substance small granules surrounding equally of glycoproteic nature. In general cells presenting Negri bodies well developed and rich in glycoproteins do not possess a visible Golgi apparatus. This fact suggests that glycoprotein of the Negri bodies originates from the Golgi apparatus since this organoid is the richest portion of cytoplasm in glycoprotein."

Okada, T., Ueno, G. & Ōtsuki, S. **Studies on the Combining Power of Inactivated Rabies Vaccine with Rabicidal Antibody.** *Japanese J. Med. Sci. & Biol.* 1954, Apr., v. 7, No. 2, 205–13. [12 refs.]

In this paper the authors publish the results of experiments devised to ascertain the degree of rabicidal antibody absorption from immune serum by vaccines in which the rabies virus has been inactivated by physical or chemical processes, and indicate the relationship of this absorptive capacity or combining power to the antigenic potency of such vaccines. The vaccines investigated—10 per cent. emulsions of guineapig brain infected with the MDH strain of rabies virus—were inactivated either by irradiation or by the addition of nitrogen mustard, merzonin, formol or phenol. The antiserum used for the absorption tests had a neutralization value of 2×10^5 MLD. In determining the combining power of vaccine with antibody the authors applied the following technique. Vaccine and antiserum were mixed in the proportion of 9 to 1, sensitized for 5 hours in a water bath at 37°–42°C., and centrifuged for half an hour at 10,000 r.p.m.; the supernatant was then removed, inactivated for half an hour at 56°C., and serially diluted 10-fold with 10 per cent. horse serum saline; to 1 ml. of each dilution was added an equal amount of active virus suspension containing 5 to 100 MLD, the mixture, after standing overnight at 5°C., being then subjected to the ordinary neutralization test by intracerebral inoculation into groups of mice. Normal guineapig brain emulsion similarly treated served as control. The difference between the logarithm of the 50 per cent. end point in the test group and the logarithm of the 50 per cent. end point in the control group expressed the combining power of the vaccine.

By application of this test the combining power of vaccines prepared by ultraviolet irradiation or by the addition of merzonin or nitrogen mustard was found to be superior to that of formolized or phenolized vaccines—a superiority equally evidenced by the results of Habel potency tests carried out on the same vaccines at the same time. As the results obtained from the new test just described generally paralleled those of potency estimation by the mouse protection test, the authors suggest the use of this new test to assess the potency of rabies vaccines. *G. Stuart*

Wells, K. F. **Control of Rabies.** *Canadian J. Comp. Med.* 1954, Aug., v. 18, No. 8, 302–9.

After briefly reviewing the measures taken by a number of other countries to control the spread of animal rabies, the author deals with the problem of control now presented in Canada by the existence, in the northern parts of its territory, of a vast reservoir of rabies infection among its wild life population. In these parts wild animals, particularly such predatory species as the wolf and the fox, have taken over from the dog as chief disseminators

of the virus, thereby exposing the human and livestock populations in frontier and fringe farming areas to a degree of risk hitherto unknown.

Prior to June 1952 outbreaks of rabies had been confined to the older, more populated areas of Canada and had occurred only among domesticated animals, mainly dogs; in these southern areas, where the dog was and is the reservoir of infection, measures based solely on dog control, with the elimination of strays, had invariably proved to be wholly effective. Since June 1952, however, as a result of the " spill over " of infection from the wildlife reservoir in the North-West Territories into the northern areas of Alberta, British Columbia, Manitoba and Saskatchewan, such measures have not been applicable, and the aim has been to reduce the number of predatory animals below the threshold level for spread of the disease and to prevent by trap lines as many of these animals as possible from filtering into the fringe farming areas, thereby protecting both human and livestock life. In Canada, since February 1953, the vaccination of dogs in the settled areas has also been practised, but such vaccination is regarded as subsidiary and of secondary importance to the two measures indicated above: controlling the movements of dogs and reducing the wild life population.

G. Stuart

Colucci, C. F. La profilassi antirabica: vecchi e nuovi aspetti del problema. [**Old and New Aspects of Rabies Prophylaxis**] *Acta Med. Italica.* 1954, Aug., v. 9, No. 8, 212–19. [44 refs.]

A general review and discussion.

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Devignat, R. La peste antique du Congo belge dans le cadre de l'histoire et de la géographie. [**The Antique Variety of Plague of the Belgian Congo from the Historical and Geographical Points of View**] *Inst. Roy. Colonial Belge. Sect. des Sci. Naturelles et Méd. Mémoires.* (Collection in-8°.) 1953, v. 23, No. 4, 47 pp., 9 maps. [Numerous refs.]

This very attractive little memoir has a far wider scope than is suggested by its title; it supplies an interesting and informative summary of the history and geographical distribution of all the varieties of infection caused by the organisms which the author has classified as *Yersinia* or *Pasteurella*. These diseases are the antique variety of plague caused by *Yersinia* [*Pasteurella*] *pestis* var. *antiqua*, the mediaeval variety of plague caused by *P. pestis* var. *mediaevalis*, the oriental variety of plague caused by *P. pestis* var. *orientalis*, and pseudotuberculosis caused by *P. pseudotuberculosis*. The author's classification of plague according to the above system was published in 1951 [see this *Bulletin*, 1952, v. 49, 45]. He thinks the mediaeval and oriental varieties of *P. pestis* may have been mutation forms of the antique variety and that *P. pseudotuberculosis* may have been a mutation form of the mediaeval variety and may have supplanted it by causing epizootics which gave rise to a cross-immunity among rodents and thereby expelled rat plague and human plague from Europe.

The author believes that *pestis antiqua* may have had its original home

in the high plateaux of central Asia and have existed there for thousands of years; from these foci it is supposed to have been spread by Aryan migrants in the pre-Christian era to Asia Minor, Egypt and from there to the centre of Africa where infection of this variety still persists. The three great pandemics of which histories exist are described. The first was the Justinian plague which spread all over the known world in the 6th century AD, killing tens of millions of people. This was probably of the antique variety. The second pandemic called the "black death" occurred in the 14th century and was followed in Europe by endemic infection which persisted for three centuries. It is presumed to have been of the mediaeval variety which still occurs in South-east Russia and the Middle East. The third pandemic, spread by sea routes all over the world during the early part of the present century, may have arisen by mutation from the antique variety. The presumed places of origin and lines of spread of these three pandemics are shown on outline maps. A set of tables gives details of the recorded dates of arrival of plague in different localities during each pandemic; references to the sources of information are given. There are also outline maps of Europe, Asia, Africa, North and South America, on which epidemic and endemic foci of plague reported between 1850 and 1950 are indicated by symbols which show the epidemiological and bacteriological types of the infection in each locality. *John W. D. Megaw*

GIRARD, G., with the technical collaboration of A. CHEVALIER. Comportement de deux souches de *Pasteurella pestis* de la variété continentale—glycérol positive—après 50 passages par le rat blanc. Premières déductions épidémiologiques. [**The Behaviour of two Strains of the Glycerol-Positive** *continentalis* **Variety of** *Pasteurella pestis* **after 50 Passages through the White Rat. Epidemiological Inferences**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 361–7.

The greater part of this paper is concerned with a discussion of some problems connected with the varieties of *Pasteurella pestis*. One of these is the glycerol-negative variety called *P. pestis* var. *oceanica* or *P. pestis orientalis*. The other is classified by the author as the glycerol-positive *P. pestis* var. *continentalis* which some observers regard as comprising two varieties, (a) *P. pestis* var. *antiqua* characterized by producing nitrous acid in ordinary broth and (b) *P. pestis* var. *mediaevalis* which does not produce nitrous acid, though the author suggests that confirmation may be needed of the reliability of this differential feature.

The experimental work described consisted in the repeated transfer through white rats, for 50 passages each, of two strains of *P. pestis mediaevalis* obtained from BALTAZARD who isolated them in Kurdistan where wild-rodent plague appears to have persisted since ancient times. One strain was isolated from a merion which is the sole reservoir of infection in the region, the other was from a human patient. Both of the strains retained their original features of glycerol positivity and non-production of nitrous acid. This finding showed that in the conditions of the experiment there was nothing to suggest that repeated passage through a commensal host could cause a change from the mediaeval to the oceanic variety of *P. pestis*. The author proposes to carry out the inverse experiment of transmitting the oceanic variety through numerous passages in wild rodents. In the meantime it seems likely that each variety remains true to type for indefinite periods of time, so that when two varieties are found simultaneously in the same region, as in Kenya, they have probably been introduced independently and at different times.

Further study is considered necessary in infected territories in which the only known reservoir of infection is the rat (as in Madagascar, and especially in New Caledonia where, after a period of 30 years of freedom from plague, the disease appeared again in 1941), with a view to finding whether in such conditions there may not be an unsuspected reservoir of wild-rodent infection which may spread to the commensal rodents. *John W. D. Megaw*

Silverman, S. J. **The Isolation of Fractions from *Pasteurella pestis* for Use in a Hemagglutination Test.** *J. Lab. & Clin. Med.* 1954, Aug., v. 44, No. 2, 185–93. [32 refs.]

The author describes the preparation of certain fractions from saline extract of *Pasteurella pestis* which when adsorbed by sheep's erythrocytes render these agglutinable by antiplague serum. Suspensions of the sensitized erythrocytes were used in a haemagglutination test which was found more strictly specific and more sensitive in the diagnosis of plague than the bacterial agglutination tests available at present.

The fractions were obtained from saline extracts of cultures of *P. pestis* by precipitation with acid or with $(NH_4)_2SO_4$. The titres of the reaction in the sera of rabbits or persons immunized by plague vaccines serve as approximate indices of the degree of protection that has been conferred. Sera containing antibodies of *Pasteurella pseudotuberculosis* did not react with the test and erythrocytes sensitized by corresponding fractions prepared from *P. pseudotuberculosis* were agglutinated only by strong concentrations of antiplague serum.

Details of the complicated method of preparing the sensitized corpuscles and of the method of obtaining the fractions will be found in the paper. There is a useful bibliography with 32 references dealing directly or indirectly with the subject of haemagglutination reactions in general.

John W. D. Megaw

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

De, S. N., Sengupta, K. P. & Chanda, N. N. **Renal Changes including Total Cortical Necrosis in Cholera.** *Arch. Pathology.* 1954, June, v. 57, No. 6, 505–15, 6 figs. [38 refs.]

A description is given of the macroscopic and histological changes in the kidneys of 14 cholera patients who had died from shock, of 10 who had died in the stage of reaction and of 8 who died of post-choleraic uraemia. The organs of the shocked patients showed evidence of incomplete and patchy cortical ischaemia and medullary congestion. These signs were more marked in the organs of patients dying in uraemia, which in addition showed degenerative and necrotic changes in the cortical tubules and splitting of the glomerular basement membrane.

It is concluded that cortical vasospasm was responsible for the complete cessation of urinary secretion, but probably not for the tissue damage. The latter may have been intensified in a few cases by the existence of haemoglobinaemia. *B. G. Maegraith*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Digilio, V. & Mazzitelli, L. L'eosinofilia nell'amebiasi. [**Eosinophilia in Amoebiasis**] *Acta Med. Italica.* 1954, July, v. 9, No. 7, 188–9, 1 chart. [15 refs.]

The English summary appended to the paper is as follows:—

"The authors have estimated the percentage of the peripheric eosinophils in 95 patients suffering with chronic amoebic colitis.

"They found that 74·7% showed normal values (not upon 3%); in 5 patients of the 25·3% who showed values superior to the normal one eosinophilia was due to other source.

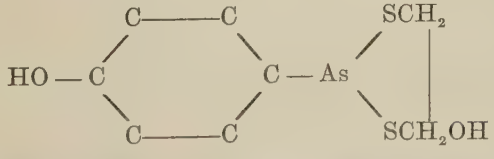
"The authors conclude that the increase of the eosinophils, which they found in 20% of the cases (this number is obtained by exclusion of the cases whose eosinophilia was due to other diseases), is not so noticeable to warrant a diagnostic value; moreover, they point out that, in all cases, an indirect source of eosinophilia as the allergic action of heterogeneous proteins adsorbed through the lesions of the intestinal wall cannot be excluded."

Anderson, H. H., Bostick, W. L. & Johnstone, H. G. **Amebiasis: Pathology, Diagnosis and Chemotherapy.**

This book is reviewed on p. 109.

Levy, J. S. & Talley, R. W. **Effectiveness of Balarsen (Mercaptoarsenal) in Treatment of Amebiasis.** *Gastroenterology.* 1952, Dec., v. 22, No. 4, 588–95, 1 fig. [21 refs.]

The amoebicides available up to the present vary in their effectiveness, and none is fully satisfactory. A good amoebicidal drug should (1) be effective in a short course of treatment, (2) have a wide margin of safety in its dosage, (3) have few, if any, side reactions, (4) be easily administered, (5) be stable, and (6) be inexpensive. The authors have investigated a new cyclical arsenical compound "Balarsen", "Mercaptoarsenal" or "S.T.B.", (N-2-acetylamino-4-methylol-cycloethylenedimercaptoarsenophenol), which is prepared from the interaction of 3-acetylamino-4-hydroxy phenylarsenoxide and mercapto propanol (BAL), with these aims in mind. The graphic formula of this compound they portray as follows:—



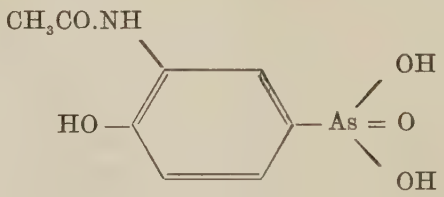
Balarsen was given to patients proven by stool examination to harbour *Entamoeba histolytica* infections. The dosage was 10 to 20 mgm./kgm.

of body weight to a maximum of 1·0 gm. daily for 5 successive days. Stools were examined for parasites daily throughout treatment and for 4 to 7 days thereafter. The patients were subsequently reviewed at monthly intervals.

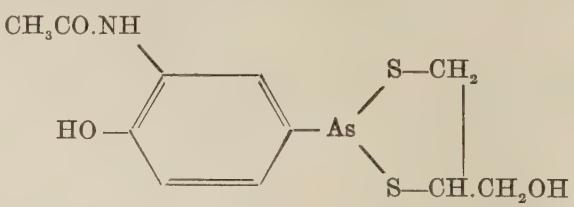
Twenty-five patients were so treated, and the period of follow-up ranged from a week to a year. Of the 25 patients 24 were relieved of their symptoms and their stools were negative after the end of the 5-day treatment; the 25th patient was retreated with Balarsen for 15 days, and by the 10th day of the second course of treatment the same result was achieved. A month after the end of treatment the stools of 23 patients were still free from parasites, those of 2 were not. The stools of all of 22 patients watched for 3 months remained negative; 12 patients observed for 6 months and 9 observed for a year have similarly remained negative. Five of the 25 patients suffered from cramps, nausea and vomiting while on the bigger dose (20 mgm./kgm.) treatment; these symptoms vanished when the treatment ended. In 3 of the 25 patients there was some enlargement and tenderness of the liver; these troubles resolved after treatment.

The authors conclude that Balarsen (STB) is an effective agent in the treatment of amoebiasis; that it gives a low relapse rate and so compares favourably with other amoebicides now in use; and that single daily doses of 10 mgm./kgm. of body weight for 5 days can safely be given.

The growing number and the multiplicity of nomenclature of the drugs now in use are increasing sources of vexation and of confusion to the practising physician. The confusion in relation to these particular BAL compounds is not lessened by a search of the literature into their origin. The abstracter is much indebted to Dr. H. C. Carrington, of Imperial Chemical (Pharmaceuticals) Limited, for the following information. The earliest record is a patent specification by Friedheim, British Patent No. 655,435 filed about 1948 and issued on 18.7.51. This seems to be the only reference to the preparation of Balarsen. The compound was first used therapeutically by Friedheim in the treatment of yaws [this *Bulletin*, 1949, v. 46, 839] who called it "STB"; this is presumably a contraction of stovarsol-BAL, though he did not disclose the formula of the product. The name Arsthinol (NNR) is applied to the French product. The graphic formula of stovarsol is:



and that of Balarsen is:



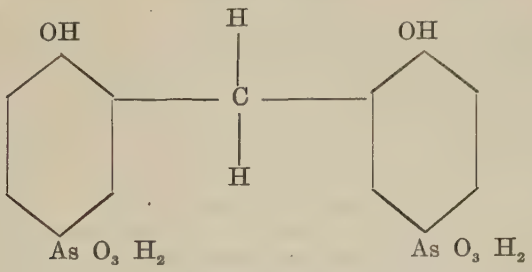
A. R. D. Adams

Loughlin, E. H., Joseph, A. A. & Mullin, W. G. **The Treatment of Amebiasis with Arsthinol (N.N.R.) (Balarsen).** *Antibiotics & Chemotherapy.* New York. 1954, June, v. 4, No. 6, 647–8.

It was noticed in Haiti that persons treated with Arsthinol (Balarsen) for yaws were freed from *Entamoeba histolytica* infections. Twenty-four, of 60 patients, with both infections were given 20 mgm./kgm. doses of the drug daily for 5 days; all were relieved of their *E. histolytica* infections as judged by stool examinations up to a time 6 weeks later. Another group of 16 patients with amoebiasis only was given 15 mgm./kgm. of the drug daily for 10 days; these also were cured of their amoebiasis. In none of the 76 patients treated with arsthinol was there evidence of toxicity of the drug. As the antibiotics now so much used for the treatment of amoebiasis are so expensive, this inexpensive, effective, and non-toxic amoebicide might profitably be used in mass treatment campaigns. Its value in the treatment of acute amoebic dysentery should also be investigated. *A. R. D. Adams*

Sawada, T., Suzuki, I. & Oka, T. **First Trial of " Bis (2-Hydroxy-5-Arsonophenyl) Methane " in the Treatment of Intestinal Chronic and Hepatic Amebiasis.** *Gunma. J. Med. Sci.* Maebashi. 1953, Dec., v. 2, No. 4, 299–304. [12 refs.]

Patients with chronic relapsing amoebic dysentery of considerable severity were treated orally with a new arsenical preparation. Its structural formula is given as follows:—



The 6 patients were given total dosages of 15 to 66·5 gm. of the drug over periods ranging from 10 to 30 days. Five of the 6 were considered to be cured of their infections by the treatment. The sixth patient, who was given 66·5 gm. of the drug over a period of 30 days, was not cured. The recommended dosage is 2·0 gm. daily (in 3 doses) for 10 days; no toxic side-effects were noticed on any dosage given. *A. R. D. Adams*

Svanidze, D. P. [**New Method for the Study of Experimental Amoebiasis**] *Med. Parasit. & Parasitic Dis.* Moscow. 1954, Apr.–June, No. 2, 138–41, 4 figs. [In Russian.]

The author describes a method devised by him for studying the course of amoebiasis and of the changes in the caecum in experimental infections of rabbits. There are two variants of this method, the essential part of which is the production of an artificial caecal fistula opening on to the surface of the abdomen.

In the first variant the distal portion of the caecum is isolated from the rest of the bowel. In the course of the operation an incision is made in the abdominal wall, the caecum is exposed, and a double ligature is made by

means of purse-string sutures, after which the caecum is severed between these two points. A metal canula with a cap is inserted into the lumen of the distal caecal stump, which is then brought up to the surface of the abdomen and stitched to the skin. In this way a permanent fistula is produced which is free of faecal matter.

The object of the second variant is to provide easy access to the lumen of the whole caecum. The operation proceeds as above but, after exposure of the caecum, a double circular purse-string suture is made through the serosa, the caecum is perforated at this point and a metal canula is inserted into the lumen. The caecum is then returned into the abdominal cavity and the incision in the abdomen is stitched, leaving only the canula exposed on the surface.

The course of both operations is clearly illustrated in diagrams. Experience has shown that 90 per cent. of the rabbits survive this operation; ten days later they fully recover and can be used for experiments. In rabbits with an artificial fistula the amoebae can be readily introduced and removed from the caecum, and continuous observations can be carried out on the course of the infection, while the development of pathological changes in the caecal wall can be followed by endoscopy. *C. A. Hoare*

McCowen, M. C., Callender, M. E., Rennell, T. & Lawlis, J. F., Jr. **Amebacidal Activity of a Series of Synthetic Diamines.** *Antibiotics & Chemotherapy.* New York. 1954, July, v. 4, No. 7, 753–62.

The tests described have been carried out *in vitro* as well as in rats, guineapigs and hamsters. In the tests *in vitro* the liquid egg yolk infusion medium of Balamuth [this *Bulletin*, 1947, v. 44, 1066] was used with *E. histolytica* cultures accompanied by a mixed bacterial flora. Two-fold dilutions of drugs were used and incubation was carried out at 37°C. for 48 hours, the end-point being determined microscopically and by subculture. The medium of Shaffer *et al.* [*ibid.*, 1948, v. 45, 1001] was used in another series of tests in which incubation was carried out for 72 hours. The *in vivo* methods used in rats were those of McCowen *et al.* [*ibid.*, 1953, v. 50, 710] in which drug treatment started one day after infection of the host with amoebae, and was generally continued twice daily for 2 days. On the fifth day the animals were killed and the degree of infection determined by the method of Jones [*ibid.*, 1947, v. 44, 1069]. The routine tests followed in guineapigs and hamsters were those of Taylor *et al.* and Reinertson and Thompson respectively [*ibid.*, 1951, v. 48, 639, 1113].

Twenty-five of the 44 di-tertiary amines *in vivo* showed amoebicidal activity. There was considerable agreement in the results obtained by the two *in vitro* methods. It was of interest that 10 compounds which possessed little *in vitro* activity were relatively active *in vivo*. There was also some correlation of activity in the different hosts. [A paper on the preparation of the bases used in the above tests was given by Shepard *et al.* to the American Chemical Society, March 17, 1953, at Los Angeles, California.] *J. D. Fulton*

Goldman, M. **Use of Fluorescein-Tagged Antibody to Identify Cultures of *Endamoeba histolytica* and *Endamoeba coli*.** *Amer. J. Hyg.* 1954, May, v. 59, No. 3, 318–25, 4 figs. on pl.

Goldman [this *Bulletin*, 1954, v. 51, 693] had already demonstrated that antisera to *Entamoeba histolytica* could be prepared, from which the globulin could be extracted and tagged to fluorescein: amoebae mixed with

this " conjugate " gave a bright, fluorescent reaction. The present paper describes the preparation of a similar antiserum to *Entamoeba coli*, and the two sera were then tested against the two organisms and a variety of others. It was first shown that normal serum tagged to fluorescein gave practically no reaction. The *E. coli* " conjugate " reacted strongly with the homologous amoeba, but only feebly with trophozoites of *E. histolytica*, while *E. histolytica* " conjugate " reacted with *histolytica* trophozoites but only feebly with those of *coli*. Some homologous amoebae stained dully, presumably because they were moribund or dead. The test was then employed to identify unknown organisms, and once certain technical difficulties (*e.g.*, lighting) had been overcome, a remarkable degree of correlation in identification was obtained. *Dientamoeba fragilis*, *Endolimax nana* and *Entamoeba invadens* showed no fluorescence with either antiserum, and what is of particular interest is the failure of the small race of *E. histolytica* to react with *histolytica* antiserum. This is further evidence of the validity of Brumpt's extra species in the *histolytica* complex [*ibid.*, 1950, v. 47, 573]. [The author rightly claims that this test provides a fairly objective method of diagnosis; it would be interesting to employ it in the case of certain organisms—*e.g.*, *E. polecki*, monkey and rat strains of *E. histolytica* or even *E. gingivalis* and observe their affinities. It would be desirable to use the same " synxenic " bacteria in the preparation of each antiserum.] *P. C. C. Garnham*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Chabaud, A. G. L'*Ornithodorus erraticus* (Lucas 1849). Multiplicité des races. [*Ornithodorus erraticus*. **The Question of Multiple Races**] *Ann. Parasit. Humaine et Comparée*. 1954, v. 29, Nos. 1/2, 89–130, 18 figs. [30 refs.]

This paper on the problem of multiple races in the tick *Ornithodorus erraticus* is the result of the most exhaustive studies undertaken by the author in collaboration with Baltazard and his colleagues of the Pasteur Institute, Teheran.

O. erraticus was first discovered in Algeria by Lucas. Since that time, it has been recorded from Morocco, Tunisia, Spain, Egypt, Iran and Kenya. In 1944, Sautet, Marneffe and Witkowski (*Bull. Soc. Path. Exot.*, 1944, v. 37, 36) discovered this species in Gao (French Sudan), but placed it in a variety *sonraï* because of its smaller size. Although *O. erraticus* infected with *Spirochaeta hispanica* was found in Morocco, it had been very difficult to find such naturally infected ticks in Tunisia and Algeria. However, the ticks in Tunisia were found to carry another spirochaete which was named *Sp. crocidurae*. As the question of relapsing fever transmission by ticks was further investigated, 3 more species of spirochaetes were isolated from this species of tick in other regions of its geographical range. These were called *Sp. merionesi* [this *Bulletin*, 1949, v. 46, 836], *Sp. microti* [*ibid.*, 1947, v. 44, 92] and *Sp. dipodilli* [*ibid.*, 1951, v. 48, 157] and, together with *Sp. crocidurae*, were found to share certain common characteristics which served to distinguish them from *Sp. hispanica*. Thus all of them were near *Sp. duttoni* and none of them was pathogenic for guineapigs.

When the author took up the present studies, the general idea about this tick-spirochaete complex was that the large variety of *O. erraticus*, corresponding to the type and occurring in Spain and the North African littoral,

transmitted *Sp. hispanica*, and that the small variety, corresponding to the variety *sonraï* and recorded from the French Sudan, South Morocco, Iran and Kenya, was the vector of a whole set of rodent spirochaetes belonging to the *crocidurae* group.

This apparent specificity of the 2 groups of spirochaetes for the 2 varieties of *O. erraticus*, and the existence of a zone in Morocco where both varieties occurred but only the large variety was found infected with *Sp. hispanica*, led the author to undertake the present investigations. Nine lots of this species from Morocco, the Morocco-Algerian border, Tunisia, Iran and Dakar were studied. On the basis of measurements of the lengths of these ticks and the results of hybridization experiments between the different stocks, the author was able to show that (1) although the size permitted the division of the ticks into at least 4 distinct varieties, there were absolutely no morphological differences which could distinguish one from the other; (2) hybridization between the varieties was possible. However, there was a distinct fall in fertility of the hybrids by the second or third generation. This seemed to correspond closely with differences in the size of the parent ticks, which in turn depended on their geographical distribution.

Baltazard and his colleagues in Teheran, as a result of individual test-feeds by infected ticks belonging to both varieties, were able to show that the specificity of the *crocidurae* group of spirochaetes and *Sp. hispanica* for the small and large varieties of *O. erraticus* was only an apparent one, *Sp. hispanica* being transmitted to a much greater extent by the large variety than by the small; in other words the specificity was not absolute.

Thus, on the basis of reciprocal fertility or specificity of spirochaetes, the two varieties of *O. erraticus* cannot be raised to the status of two distinct species. However, the author concludes that this species as a result of strong local adaptations might have branched out into a number of local races distinguished mainly by their difference in size and the spirochaetes with which they are found naturally infected. *M. G. R. Varma*

Burgdorfer, W. & Davis, G. E. **Experimental Infection of the African Relapsing Fever Tick, *Ornithodoros moubata* (Murray), with *Borrelia latychevi* (Sofiev).** *J. Parasitology.* 1954, Aug., v. 40, No. 4, 456–60.

The authors describe experiments showing that *Spirochaeta latychevi*, the Asiatic relapsing fever spirochaete, will persist in various organs of all stages of *Ornithodorus moubata*, and is transmitted to the progeny of infected ticks. Direct examination showed that the spirochaetes passed through the gut wall and entered the haemolymph and penetrated the various organs, including the salivary glands, the walls of the Malpighian tubules, the coxal glands and the genital system, and were found to persist more than 150 days. Nevertheless, 73 transmission experiments, in which these ticks in lots of 3 to 10 were fed on adult mice or new-born rabbits, gave uniformly negative results. The inoculation of suspensions of infected *O. moubata* into mice and new-born rabbits resulted in only a few animals becoming infected and in most cases the inocula, although containing numerous spirochaetes, failed to produce infection. On the contrary, animals inoculated with blood from a mouse that had been infected by the natural host of the spirochaete, *Ornithodorus tartakovskyi*, all became infected.

It is evident, therefore, that the passage of *Spirochaete latychevi* through *Ornithodorus moubata* is accompanied by a change in virulence. [See also this *Bulletin*, 1952, v. 49, 957.] *Edward Hindle*

i. Baltazard, M. Au sujet d'une précédente communication : sur l'infection " inapparente " dans les spirochétoses. [**Concerning a Previous Communication on " Inapparent " Infections in Spirochaetoses**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 374–5.

ii. Burgdorfer, W. & Baltazard, M. Sur les spirochétoses dites " inapparentes ". [**So-called " Inapparent " Spirochaetoses**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 375–7.

i. The author wishes to withdraw the communication on this subject recently published, in collaboration with Habibi [this *Bulletin*, 1954, v. 51, 932]. These conclusions were based on the results of the examination of thick blood films, and further work, in conjunction with Burgdorfer [see below], has caused the author to modify his opinion.

ii. The authors have re-examined the question of an invisible stage in spirochaetal infections, using guineapigs infected with various strains of *Spirochaeta crocidurae*, white rats infected with strains of the same species and also with *S. latychevi*, and certain species of wild rodents infected with the same strains. They find that thick blood films examined before, during and after the collection of blood for passage inoculations, practically always contain spirochaetes if the blood inoculation is positive. Conversely the passage is practically always negative if the blood films are negative. The spirochaetes in the blood films are usually extremely rare, sometimes only a single specimen being found in a series of films, but are of normal dimensions.

The authors are of the opinion that " inapparent " infections in the strict sense of the term do not exist in the species examined. They suggest the term " occult infections " for those cases in which the ordinary microscopical examination of the blood is not sufficient to decide whether spirochaetes are present or absent and where it is usually necessary to make animal inoculations to detect any infection. *Edward Hindle*

Sicart, M. Les fièvres récurrentes protègent-elles contre le paludisme? (Observations faites en Tunisie.) [**Do Relapsing Fevers protect one against Malaria? (Observations in Tunisia)**] *Bull. Soc. Path. Exot.* 1954, v. 47, No. 3, 377–80, 1 chart.

The author describes a certain number of localities where in the same houses patients became infected either with relapsing fever or with malaria but not with both diseases simultaneously. In addition a rise in the curve showing the incidence of relapsing fever coincided with a fall in the malaria rate, and the latter rose again after the relapsing fever had disappeared. It is suggested that the antibodies produced while spirochaetes are present in the circulation may have some antagonistic action on the malaria parasites.

[Somewhat similar antagonistic action has been recorded in mixed infections of spirochaetes and trypanosomes.] *Edward Hindle*

Hirschboeck, Mary M. **The Use of Chloramphenicol in Relapsing Fever.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 712–13.

In the Pusan area of Korea, a very virulent form of louse-borne relapsing fever occurs. The patients are usually very toxic and profoundly prostrated. The author tabulates the results of treating 27 such patients with chloramphenicol for one day only. The ages varied from 5 to 54 and the

temperature from 100°F. to 104·2°F. All but 5 had enlarged spleens and half were jaundiced. The duration of illness varied from 3 to 20 days.

The total dosage was at first 2 gm. given on a single day in 4 equal doses at 3-hour intervals. Later this was halved and the total of 1 gm. gave equally good results. In every case the blood was negative for spirochaetes within 24 hours and clinical improvement was rapid. Since the drug is given orally, the treatment is very useful in a busy clinic.

The patients were observed "over varying periods of time after treatment" [but in the absence of a statement regarding the length of follow-up the long-term value of this one-day treatment cannot be assessed].

H. J. O'D. Burke-Gaffney

YAWS AND OTHER TREPONEMATOSES

Grin, E. I., Guthe, T., Payanandha, L., D'Mello, J. M. F. & Swaroop, A. S. **The Treponematosis Control Program of the World Health Organization. The Treatment of Yaws with Benzathine Penicillin G.** *Amer. J. Syph.* 1954, Sept., v. 38, No. 5, 397–404, 2 figs. [28 refs.]

Large numbers of treponematosis control programmes have been carried out in various parts of the world.

These authors report the treatment of yaws in 236 patients in a rural district of Thailand with benzathine penicillin (NN′-dibenzylethylenediamine dipenicillin G) and compare the results with those obtained with PAM.

In palmar and plantar hyperkeratosis the former induced healing in 84 per cent. of 21 cases in 6 months compared with 47·5 per cent. with the latter in 12 months; in early infectious yaws the two remedies proved about equal; when the effects of treatment were judged serologically both early infectious yaws and hyperkeratosis showed similar results with the two remedies.

The earlier treatment was started the better were the serological results; 29 per cent. showed sero-reversal when treated during the first year, dropping to 5 per cent. after 3–4 years and 0 per cent. after 5 years.

Side effects were slight but more frequent than after PAM; one difficulty was that benzathine penicillin had to be dissolved whereas PAM was made up ready for use; this complicates the procedure when medical auxiliaries carry out most of the treatment

T. E. Osmond

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Dharmendra. **Social Aspects of Leprosy.** *Leprosy in India.* 1954, July, v. 26, No. 3, 113–20. [Reprinted from *Indian J. Social Work.*]

The incidence of leprosy in India, based on the 1941 census and taking the total population of India as 210,350,000, is given as 5·4 per thousand. [The 1951 census gives the population of India as 357 million.] The State

with the highest incidence is given as Western Bengal with 14·7 per thousand. The need for a changed attitude on the part of the public to leprosy is emphasized, so that it may be counted as a disease and not as a curse, and exaggerated fear of those with leprosy, especially when it has ceased to be infectious, may be removed. The beggar problem is a particularly difficult one in India as the money and institutions needed for them are not available. Much could be done, however, by making treatment available to all, and by BCG vaccination of children. Great care must be exercised in avoiding the employment of infectious patients in certain trades, and especially as school teachers and other employments involving close contact with children. *Ernest Muir*

Levan, N. E. **Leprosy acquired in Military Service during World War II. Report of a Case.** *J. Amer. Med. Ass.* 1954, Sept. 11, v. 156, No. 2, 126–7.

An American soldier who had served in New Guinea and the Philippines during the second World War first showed symptoms of leprosy in a painless ulcer on the calf. In December 1952 leprosy was suspected when the area of anaesthesia had spread to cover half the calf and the patient had a burn on this area without feeling it. The histamine and pilocarpine tests were found positive, but a diagnosis of leprosy was not made till June 1953 when there were pink macules on the trunk and limbs, and acid-fast bacilli were found in sections and smears. The patient was put on out-patient treatment with diasone, certain restrictions being taken to prevent contact, especially with children. After 3 months' treatment the macules had disappeared and smears had become negative.

This is in line with a prediction made by Aycock and Gordon in 1947 [this *Bulletin*, 1948, v. 45, 186] that an appreciable number of cases of leprosy would result from service in endemic areas during World War II, as there had been after the Spanish-American war. [See also this *Bulletin*, 1948, v. 45, 441; 1953, v. 50, 1050, *bis.*] *Ernest Muir*

Lowy, Luela & Ridley, D. S. **The Acid-Fast Staining Properties of** *Mycobacterium leprae*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, Sept., v. 48, No. 5, 406–10. [13 refs.]

The method of staining propounded is a modification of that described by Wade [see this *Bulletin*, 1952, v. 49, 626]. The 2 reasons for the difficulty of staining lepra bacilli in sections are that the bacilli absorb paraffin wax, and their acid-fastness is destroyed as a result of extraction with fat solvents. Tubercle bacilli in heat-fixed smears were found to be much less susceptible to fat solvents than lepra bacilli as regards their acid-fastness, and they were not at all affected by impregnation with paraffin wax. Turpentine (as mentioned by Wade), when used as an oil solvent, was found to be better than xylene or other fat solvents for removing paraffin, more bacilli were stained and the staining was of a deeper colour. Turpentine without oil was found to restore acid-fastness better than oil mixture, although previously it had been used to destroy it. The active principle of turpentine, pinene, restored acid-fastness only if it were present in contact with the bacilli at the moment of application of the acid used for differentiation. There was no advantage in applying pinene before staining or for more than a moment before applying the acid, but if at this point it were washed off, or allowed to evaporate to dryness, its effect was lost. For differentiating, 25 per cent. aqueous acetic acid is recommended.

The explanation of the effect of pinene is given as follows: "The insoluble core of the lepra bacillus takes up carbol-fuchsin; it partially regains its acid-fastness if some substance which wets lipids but is immiscible with acid if applied immediately before the acid. Certain terpenes are particularly effective in this respect." *Ernest Muir*

Mauzé, J. & Arnaud, G. L'électrophorèse du sérum de lépreux. [**Electrophoretic Studies of the Serum in Leprosy**] *Internat. J. Leprosy.* New Orleans. 1954, Jan.–Mar., v. 22, No. 1, 55–60.

The English abstract appended to the paper is as follows:—

"The authors hold that electrophoresis, whether by the classical technique or by the paper method, is at present the best and most precise method of investigating sera. They have tested the sera of 100 patients, of various types and grades, most of whom have been under sulfone treatment. The paper method of Macheboeuf was used in this work.

"It was found that, whatever the clinical form of the case, the albumin fraction is diminished, while the γ globulin, the α globulin, and the β globulin are constantly increased. When the γ fraction reaches K = 2·0, the patient is in a bad condition and reacts poorly to treatment. The nearer it is to 1·0, the more stable is the case and the more amenable to treatment. Increase of α_2 and β, together or separately, to 1·8 or more signifies important intestinal parasitism or microfilaria.

"The authors believe that electrophoresis of the serum is an excellent means of determining the patient's response to treatment, that the γ fraction is the most interesting, and that the sulfones do not cure the disease."

Miguel, S., Roldan, A., Guillen, J., Terencio, J. & Ponciani, J. Proteinas plasmaticas en la lepra. [**Plasma Proteins in Leprosy**] *Internat. J. Leprosy.* New Orleans. 1954, Jan.–Mar., v. 22, No. 1, 47–54, 10 figs. on 2 pls.

The English abstract appended to the paper is as follows:—

"In our study of the serum proteins of leprosy patients by electrophoresis, the examinations were indiscriminately made by the cell method (Kern apparatus) and the paper technique (Macheboeuf-Rebeyorotte apparatus), ascertaining first in both instances the mean value in normal subjects for a point of reference. The findings in the patients were as follows: Total proteins were usually about normal in values, although they were increased in more cases than decreased. The albumin-globulin ratio was generally below unity. The globulin fractions were increased, especially the gamma fraction, there being a decrease of the alpha globulin in the cases where the gamma showed the most marked increase. These changes were most pronounced in the more advanced lepromatous patients, especially those with manifest visceral amyloidosis. In the phases of lepra reaction the disturbances of the globulins were pronounced, but they partly subsided when the lepra reaction disappeared.

"For the evaluation of the Weltman band reaction, the cadmium reaction, the Takata-Ara reaction, and the erythrocyte sedimentation, these tests were made at the same time that the electrophoresis studies were performed. The sedimentation rate was found to be the most sensitive, and to be more in accord with the albumin-globulin ratio and with the gamma globulin increase than the others. In second rank are the cadmium and the Weltman band tests. We found the Weltman band abnormal (either diminished or

prolonged) in 78 per cent of the patients, indicating especially the protein disturbances in lepra reactions, in which the band was constantly shortened. In toxic disturbances of the liver caused by the medication the band was always prolonged, while the Takata-Ara reaction was positive in all cases."

Ridley, D. S. **The Significance of Antibody in the Pathogenesis of Leprosy.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, Sept., v. 48, No. 5, 400–405. [15 refs.]

The hypothesis is propounded that " during a long incubation period . . . the leprosy bacillus would establish itself by multiplication to the point where it could effectively challenge the natural defence forces and invade the open tissues of the skin ", this multiplication taking place in the peripheral nerves where, according to the hypothesis, the defence forces cannot get at the bacilli. This would imply that the defence mechanism, consisting of humoral factors, might play an important part in the initial defence of the host against the leprosy bacillus. Complement-fixation tests were carried out with 3 MHD of complement and serial dilutions of serum, with 6 different antigens including 2 forms of lepromin, 3 forms of tuberculin and Wassermann reaction antigen. In many cases with negative lepromin skin reaction, lepromin complement-fixing antibody was present in the circulation, but no antibody against tuberculin could be detected. Mixing and incubating sera from 2 lepromatous cases with lepromin destroyed the power of the lepromin to evoke a skin reaction in tuberculoid leprosy. Absence of fixed antibody or, alternatively, the presence of a masking circulating antibody, are theoretical reasons why lepromin reaction may be negative. There is no evidence that lepromin antibody has the power to promote immune reaction in any of the forms of established leprosy.

Ernest Muir

Floch, H. La réaction de Vernes (péréthynol A) est, des réactions séroloriques utilisées jusqu'ici, celle qui donne dans les tréponématoses les résultats qui concordent le mieux avec ceux du test de Nelson (T.I.T.). [**The Vernes Reaction (Perethynol A) is the one, of all Reactions practised up to now, which gives the greatest Agreement with Nelson's Test in Treponematoses**] *Arch. Inst. Pasteur de la Guyane Française. Publication No. 319.* 1954, Mar., 4 pp.

Of 90 sera from leprosy patients 50 gave positive results with classical serum tests for syphilis but only 12 of these gave positive treponemal immobilization reactions (TPI); of 30 sera considered to be non-syphilitic only 1 gave a positive TPI test. In the case of sera from patients with leprosy the author considers the Kline standard and the Debains test to be the most reliable of all the classical ones.

Nineteen sera from cases of leprosy were submitted to the following tests: TPI, Vernes, Meinicke turbidity, Debains, Kline. Kolmer and Kahn. TPI and Vernes agreed in 18, TPI and Meinicke in 17, TPI and Debains in 17, TPI and Kline in 17, TPI and Kolmer in 12, and TPI and Kahn in 7. Thus in a country where leprosy is endemic the Kahn is the least and the Vernes the most reliable.

Demanche is quoted as of opinion that the Vernes test rarely gives false positive results and Ranque and Tramier (*Bull. Soc. Française Dermat. et Syph.*, 1953, No. 4, 378) that it is both sensitive and specific while the TPI test though extremely reliable is difficult to perform and interpret.

T. E. Osmond

Floch, H. Sur la thérapeutique des réactions lépreuses. Intérêt du Colchicoside. [**The Use of Colchicoside in the Treatment of Leprosy Reactions**] *Arch. Inst. Pasteur de la Guyane Française. Publication No. 324.* 1954, May, 7 pp. [14 refs.]

Colchicoside is a colchicine derivative, but is much less toxic than colchicine. It has a desensitizing effect similar to corticotrophin and cortisone, and can be used in controlling lepra reaction, especially when it occurs as the result of treatment with sulphones or thiosemicarbazone. Five patients were treated with it during reaction, and in 4 of these the reaction subsided rapidly and satisfactorily. The dose recommended is 5 mgm. daily for 2 days and then 10 mgm. daily for 8 days. It is given intravenously. The author considers that so far it is the best treatment for lepra reaction that he has tried. *Ernest Muir*

Dharmendra & Chatterjee, K. R. **Treatment of Leprosy with Thiosemicarbazone. An Analysis of Three Years' Findings.** *Leprosy in India.* 1954, July, v. 26, No. 3, 97–112. [12 refs.]

Thiosemicarbazone was used in Calcutta in the treatment of 112 cases of leprosy, of which 87 were lepromatous, 15 tuberculoid and 10 simple maculo-anaesthetic. Of these, 39 were treated for less than a year, 23 for 1 to 2 years, and 50 for 2 years or more up to 3 years. About 10 per cent. were intolerant to the drug even in 6 mgm. doses, and treatment had to be discontinued. Of the lepromatous patients 9 were sensitive to the drug and 10 others could not tolerate more than 50 mgm. a day. Clinically, there was complete subsidence in 23, and almost complete subsidence in 45 others. There was marked bacteriological improvement in 33, out of whom 18 became negative.

Of 68 lepromatous patients who had shown initial improvement 23 did not maintain this improvement.

Compared with sulphones the return of sensation and growth of new hair in the affected parts are seen more frequently and markedly with thiosemicarbazone. With the latter, toxic manifestations are more frequent and severe, but lepra reaction is less marked. In lepromatous patients the effects of treatment with thiosemicarbazone become less after about a year, and after another 6 months the disease may begin to increase again. In the other types of leprosy the disease is more likely to become arrested before this deterioration sets in. Because of the greater danger of toxic effects more medical supervision is necessary, especially during the earlier part of the treatment. There is also the disadvantage of the greater cost of thiosemicarbazone.

In those who do not tolerate sulphones, or in whom sulphones have ceased to cause improvement, thiosemicarbazone may be sometimes used with advantage. [For a previous report, see this *Bulletin*, 1953, v. 50, 35.] *Ernest Muir*

Lowe, J. [**TB1 in Leprosy.**] [Correspondence.] *Leprosy in India.* 1954, July, v. 26, No. 3, 150.

Results of 38 months' study of TB1 [thiosemicarbazone] in 273 cases of leprosy are referred to. Results in the 1st year were good, often very good; in the 2nd year they were fair; in the 3rd year they were poor or bad, sometimes very bad. The author recommends that TB1 should be used: (a) for a year when sulphones cause severe reactions to begin with; (b) for

a few months when progress under sulphone is slow; (c) when there is intolerance to sulphones (allergy, dermatitis, psychosis). Sulphones are considered the best single treatment of leprosy so far, but in some cases a suitable alternation with TB1 may be the most efficacious treatment. [For earlier reports by the author, see this *Bulletin*, 1953, v. 50, 126, 1147.]

Ernest Muir

Azulay, R. D. **The Protective Role of BCG in Murine Leprosy.** *Internat. J. Leprosy.* New Orleans. 1954, Jan.–Mar., v. 22, No. 1, 61–4.

This is an account in English of the work described in a previous paper [this *Bulletin*, 1954, v. 51, 1258] and covers the same ground.

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—Trematodes (*schistosomes, other flukes*); Cestodes (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); Nematodes. (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

Rey, L., Amato Neto, V., Campos, R. & da Silva, L. H. P. Investigação sôbre um novo foco de esquistossomose em Uraí (Estado do Paraná). [**Study of a New Focus of Schistosomiasis in Uraí, Paraná, Brazil**] *Folia Clin. et Biol.* S. Paulo. 1953, Dec., v. 20, No. 3, 215–29, 1 map & 5 figs. on 3 pls.

The English summary appended to the paper is as follows:—

"The authors verified the existence of a new focus of schistosomiasis (*Schistosoma mansoni*) in the Northern part of the State of Paraná, Brazil —the village of Urai. This is the second focus described in that State, where the first was found in the village of Jacarezinho, by Coutinho and Pessoa, in 1949. [See this *Bulletin*, 1949, v. 46, 1058.]

"In Urai, 142 intradermal tests were performed, with an antigen made of adult worms (*S. mansoni*); 31, or 21·8 per cent, were positive. Among persons who had never left the county, the rate of positives was 11 per cent.

"Of 115 fecal examinations by Hoffman, Pons and Janer's method (spontaneous sedimentation), 17, or 14·7 per cent, were positive. Four cases were definitely autochthonous and 15 out of the 17 positives lived close to or frequented water collections where *Australorbis* snails were found infected with cercariae of *S. mansoni*."

Oliver-González, J. **Anti-Egg Precipitins in the Serum of Humans infected with** *Schistosoma mansoni.* *J. Infect. Dis.* 1954, July–Aug., v. 95, No. 1, 86–91, 3 figs.

Vogel and Minning [this *Bulletin*, 1949, v. 46, 1154] observed that a homogeneous membrane formed around live cercariae of *Schistosoma mansoni* when these were immersed in the sera of human beings or of certain experimental animals infected with this parasite. Papirmeister and Bang [*ibid.*, 1949, v. 46, 55] recorded the formation of precipitates,

and Liu and Bang [*ibid.*, 1950, v. 47, 1105] the agglutination of the cercariae under similar circumstances. [The authors make no reference to Standen's contribution to this subject (*ibid.*, 1952, v. 49, 778).] Schistosome eggs lodge in the host's tissues for long periods and may therefore be a potent and constant source of antigen leading to the formation of antibodies differing from those developing against the cercariae and the adults.

The present paper describes the detection of these antibodies as revealed by the formation of a precipitate *in vitro* around the eggs of *S. mansoni* when these were incubated with the sera of human beings or monkeys suffering from intestinal schistosomiasis. The reaction did not occur when the sera of uninfected persons were used, " even though infection with *Ascaris*, hookworm, *Trichuris* and with *Endamoeba histolytica* was present ". [If these results are confirmed, it may well be that at last we have available a reliable laboratory test for the recognition of schistosomiasis.]

R. M. Gordon

Barroux, P., D'Almeida, J. & Letac, R. Péritonite par perforation vésicale bilharzienne. [**Peritonitis from Perforation of the Bladder infected with** *Schistosoma*] *Bull. Méd. de l'Afrique Occidentale Française.* 1954, v. 11, No. 1, 137–40.

Report of a case.

Friedheim, E. A. H., da Silva, J. R. & Martins, A. V. **Treatment of Schistosomiasis mansoni with Antimony-a,a′-Dimercapto-Potassium Succinate (TWSb).** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 714–27.

This compound resembles antimony tartrate but the oxygen atoms of the hydroxyl groups are replaced by sulphur. As a result the antimony is more tightly bound and decomposition if it occurs, for example during heating, leads to the practically non-toxic antimonous sulphide instead of to the toxic antimonous oxide as in tartar emetic. TWSb is a white powder, soluble in water to 30 per cent. and resistant to brief boiling. In mice its acute toxicity is 1/10 that of fuadin and 1/50 that of tartar emetic. For clinical use, it was made up as 5–10 per cent. solution in distilled water or 5 per cent. glucose and given intramuscularly (< 5cc.) or intravenously (< 10cc.).

During the present work 134 patients in Brazil were treated but none showed clinical disturbance of the circulatory system, and there were no significant changes in the electrocardiogram. Even after a dose of 1 gm. given intravenously there was no significant change in the blood pressure. Some patients complained of discomfort described as " bitter mouth ", abdominal discomfort, decrease of appetite, nausea, diarrhoea or constipation. In 50 patients treated with 300 intravenous injections vomiting occurred in 14. Skin rashes occurred in 7 of the 50 patients; they cleared up spontaneously in 2–5 days. No toxic effects were observed in the lungs, kidneys, or blood. Vague pains in the shoulders or legs occurred in 3 patients.

Intramuscular injections were made with 0·5 gm. of drug. These caused no ill effects apart from some discomfort at the moment of injection.

Seventy patients suffering from *Schistosoma mansoni* infections were treated intravenously with 0·7 to 2·3 gm. total, or intramuscularly with 3·2–3·7 gm. total. The duration of treatment was 1–13 days. The cases

were followed by examination of stools and of rectal biopsies. Fifty-eight patients were treated intravenously with 4–8 injections totalling 0·023–0·042 gm. per kgm. given during 1–3 days. Ninety-one per cent. of these were considered to be cured and 9 per cent. relapsed. In children treated with 3 doses during 48 hours, the total dose required for cure is about 0·04 gm. per kgm. Three patients were treated with 7 intramuscular injections each totalling ·057 gm. per kgm. during 10–13 days; all three appeared to be cured. The clinical features, doses and results in all these cases are set out in great detail. [According to the above report, this compound is an effective and non-toxic remedy for mansonian schistosomiasis; further reports on this compound by other observers will be welcomed in order to supply confirmation or modification of these claims.] *F. Hawking*

Bayer, F. A. H. **Larval Trematodes found in some Fresh-Water Snails: a Suggested Biological Method of Bilharzia Control.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1954, Sept., v. 48, No. 5, 414–18.

During an investigation of a focus of human schistosomiasis near Durban [this *Bulletin*, 1954, v. 51, 1260], dissection of the snails collected, including *Physopsis africana*, *Biomphalaria pfeifferi* and *Bulinus tropicus*, revealed a large variety of larval trematodes of which only one was a species infecting man (*Schistosoma mansoni*). It was noted that parasitized snails died much sooner than uninfected ones under identical conditions, and that infection caused extensive damage to the digestive gland and sometimes the gonads. Massive infections with echinostomatid larvae were frequent and very destructive to the snails' tissues. The definitive hosts of some echinostome flukes are waterfowl, including ducks, which feed on the snails, and the author comments that human schistosomiasis is now common in many localities where the waterfowl have disappeared. It is suggested that, in addition to controlling human pollution of streams, some of the biological agents which tend to limit snail populations should be restored. It may be possible to increase the incidence in snails of disease resulting from infection with echinostomes unlikely to affect man or his livestock, by preserving waterfowl strictly and introducing ducks infected with echinostomes. This measure should follow initial treatment with a molluscicide, after which it might be effective in maintaining the snail population at a stable and safe minimum. *T. H. Davey*

Kagan, I. G., Short, R. B. & Nez, Martha M. **Maintenance of *Schistosomatium douthitti* (Cort, 1914) in the Laboratory (Trematoda: Schistosomatidae).** *J. Parasitology.* 1954, Aug., v. 40, No. 4, 424–39, 2 figs. [43 refs.]

Haemmerli, U. Schistosomendermatitis. [**Schistosome Dermatitis**] *Schweiz. med. Woch.* 1954, Aug. 7, v. 84, No. 32, 929–31, 4 figs.

A general account of "swimmer's itch" which occurs among persons bathing in fresh-water lakes and pools infested with skin-piercing cercariae. The reaction is caused by the penetration into the skin of previously sensitized persons, of certain species of schistosome cercariae, whose normal vertebrate hosts are various species of water-fowl. The author points out that although the diagnosis can usually be made on clinical grounds, the

only certain method is to examine sections cut from an excised papule. Two methods of control are suggested, both aimed at the elimination of the snail vectors. The first is the use of copper sulphate to kill the snails, and the second is the removal of all water plants and, in order to prevent their re-growth, the paving of the bottom of the pool with pebbles. The second method, although the more expensive, provides a more permanent result.

This is a good general account illustrated with original diagrams and photographs, but does not appear to contain any observations not already recorded in the literature. *R. M. Gordon*

YASUDAOKA, K. **Ecology of the Miracidium. II. On the Behavior to Light of the Miracidium of** *Fasciola hepatica*. *Japanese J. Med. Sci. & Biol.* 1954, Apr., v. 7, No. 2, 181–92, 6 figs.

"1. The miracidium of *F. hepatica* showed a marked positive phototropotaxis to more feeble light than 100 Lux. No phototropotactic behavior of miracidia were found to more intense light than 100 Lux.

"2. The effect of light of different wave length upon the phototactic reactions of miracidia was found as follows: green (547 ± 15 mμ) > yellow (595 ± 14 mμ) > blue (427 ± 18 mμ) > red (630 ± 14 mμ).

"3. Reversal of phototaxis of miracidia was observed by a sudden increase or a decrease of light intensity.

"4. The increase of temperature caused an increase in the velocity of phototactic locomotion of miracidia, and the relation between the two was able to manifest as the equation of the first degree: $v = -1{\cdot}676 + 0{\cdot}146x$ in which v meant the velocity of locomotion, and x the temperature.

"5. The higher alcohols were more effective to paralyse phototaxis of miracidia than the lower ones."

STIEGLER, L. Untersuchungen über die Zwischenwirtsspezifität von *Fasciola hepatica* im Raume Nordbayern. [**Studies on Intermediate Host-Specificity of** *Fasciola hepatica* **in the North Bavarian Region**] *Ztschr. f. Parasitenk.* 1954, v. 16, No. 4, 322–50, 18 figs. [Numerous refs.]

FABIENKE, Margot. Bandwurmkuren mit Atebrin. [**Treatment of Tapeworm Infections with Atebrin**] *Ztschr. f. ärztl. Fortbildung.* 1954, July 15, v. 48, No. 14, 498–501. [20 refs.]

The author refers to the literature on this subject, some of which has been abstracted in this *Bulletin* and reports on results obtained by the treatment with atebrin [mepacrine] of 42 patients most of whom were infected with *Taenia saginata*. The mode of action of the drug is discussed. Probably, like *Filix mas*, it damages the head of the worm, but some of it is absorbed in the intestine and is excreted back to act a second time. A dose of 1 gm. atebrin is effective in one hour. This exceeds the dose of 0·6 gm. given for malaria, but the side effects are exceedingly rare and have no clinical significance. Of the 42 patients treated one had probably been cured by previous treatment with *Filix mas* and the treatment of 7 others had to be discontinued because of gastric lesions. Of the remaining 34 cases fully treated with atebrin, 28 (82 per cent.) were cured. The atebrin was applied through a duodenal or jejunal sound near to the scolex of the worm. The technique of this procedure is discussed. An hour

after the atebrin has been given 60–80 cc. of 30 per cent. $MgSO_4$ are given into the duodenum and the worm is expelled 1–2 hours after administration of the purgative. If it is not expelled, the $MgSO_4$ is repeated. In the author's clinic atebrin is the treatment of choice, *Filix mas* being reserved for cases resistant to other treatment. The author's cases, unlike those reported by others, included an unusually high proportion of women, the figures being 22 women aged between 15 and 74 years and 6 men aged between 22 and 65 years. *G. Lapage*

Pérez-Fontana, V. **Investigations on Eggs of Helminths, with special reference to the Epidemiology of Hydatid Disease.** [Translated and abstracted by T. D. Magath.] *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 762–3.

The author refers to the difficulties in field surveys of finding eggs of helminths as they occur in nature.

He has experimented with means of conserving and detecting eggs of *Echinococcus*, *Hymenolepis*, *Ascaris* of the pig and dog, *Trichuris* and *Taenia*. He describes a method whereby sediment after decantation or precipitation is dried carefully on fine filter paper over a flame and then treated with xylol in a Petri dish so that the paper becomes transparent and can be examined microscopically. These preparations keep indefinitely.

For fixation, staining and preservation in one operation, before the material is transferred to the paper, the sediment is treated with a mixture of 10 per cent. formol, 500 ml.; 5 per cent. Lugol's solution, 50 ml.; and acetic acid, 5 ml. It is then strained through a double layer of gauze and alcohol added until sedimentation begins. The decantation process may be accelerated by the addition of 10 per cent. alum which also acts as a stain fixative.

Flotation is carried out by Willis's method; the floating eggs may be collected and placed on the filter paper after 10 minutes.

The author has successfully recovered ova from faeces of dogs, mud from the belly wool of sheep and mixed faeces from animals in this way. The material is diluted with 250–500 ml. of water and filtered through a double layer of gauze over a metal colander. An amount of the solution described above, equal to one-third of the total diluted material, is stirred with the suspension and alcohol added until sedimentation begins. It has been shown that almost all the eggs are found at the surface. Eggs were also recovered in this way from the sweepings of floors soiled with animal faeces. *H. J. O'D. Burke-Gaffney*

Bobo Morillo, T. & Vos Saus, R. El quiste hidatídico (hidatidosis) y su diagnóstico por el laboratorio. [**Hydatid Cyst and Its Diagnosis by Laboratory Methods**] *Med. Colonial.* Madrid. 1954, Sept. 1, v. 24, No. 3, 231–48. [41 refs.]

Camelin, A., Bénazet, F., Miéral, R. & Vigne, J. Echinococcose alvéolaire du foie avec mise en évidence du parasite à la biopsie per-opératoire. [**Alveolar Hydatidosis of the Liver, with Detection of the Parasite at Biopsy**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1954, Nos. 21, 22 & 23, 747–51, 1 fig. [10 refs.]

Trincão, C., Parreira, F., Gouveia, E. & Franco, A. Alguns dados relativos à cito-química leucocitária na ancilostomíase. [**Cytochemical Studies of the Leucocytes in Ankylostomiasis**] *Anais Inst. Med. Trop.* Lisbon. 1953, June, v. 10, No. 2, 181–7, 7 figs. (4 coloured) on 3 pls. [18 refs.]

The English summary appended to the paper is as follows:—

"The writers investigated qualitatively the variations in the polysaccharide, lipid, peroxydase and alkaline phosphatase content of leukocytes in hookworm anaemia.

"No gross variations from the normal have been detected regarding polysaccharides, lipids and peroxydases, but the alkaline phosphatase seems to be increased."

Carr, H. P., Pichardo Sardá, M. E. & Nuñez, N. A. **Anthelmintic Treatment of Uncinariasis.** *Amer. J. Trop. Med. & Hyg.* 1954, May, v. 3, No. 3, 495–503.

"Tetrachlorethylene, U.S.P., when administered without being followed by a purge, causes less shock to the patient and is more efficacious in removing hookworms than when the anthelmintic is followed by a saline purge.

"A dosage scale of 0·05 cc. tetrachlorethylene per pound of body weight, with a maximum dose of 4·0 cc., is quite efficient in removing hookworms and is safe for the patient. A dosage scale of 0·06 cc. tetrachlorethylene per pound of body weight, with a maximum dose of 5·0 cc., is also highly efficacious and causes no more untoward symptoms than does the smaller dosage.

"More than 591,000 treatments have been given to about 385,000 patients using tetrachlorethylene without a purge. Of these, 388,623 treatments were of the first dosage scale indicated above, and 52,611 were of the second dosage scale. At present, the latter is being employed exclusively in our hookworm clinics.

"In hookworm-counted, controlled treatments there was no increase in anthelmintic efficiency as a result of alternating treatments with tetrachlorethylene and hexylresorcinol. There was no increase in anthelmintic efficiency as a result of administering the tetrachlorethylene in fractionated doses, nor did emptying the intestine by means of a laxative before the anthelmintic treatment increase its efficacy." *B. G. Maegraith*

Yanagisawa, T. & Ishii, K. **On the Granules in Cytoplasm in relation to the Formation of *Ascaris* Egg-Shell.** *Japanese J. Med. Sci. & Biol.* 1954, Apr., v. 7, No. 2, 215–29, 18 figs. on 3 pls. [15 refs.]

Merrill, G. G. **Symptoms of Ascariasis, with special reference to Convulsions.** *Amer. J. Dis. Children.* 1954, Sept., v. 88, No. 3, 294–7. [15 refs.]

"In a study of 200 children with proved ascariasis, 17 (8·5%) had a history of convulsions, but only 2 of these (1%) had acute convulsive disorders that did not persist for long intervals before and after the episode of ascariasis. This suggests that convulsions due to ascariasis do not occur any more often than convulsive disorders in the general population."

Widmaier, R. Komplikation bei Verwurmung, insbesondere beim Ascaridenbefall. [**Complications in Worm Infections, especially in Infections with** *Ascaris*] *Ztschr. f. Hyg. u. Infektionskr.* 1954, v. 140, No. 2, 169–72.

During an investigation lasting three years, carried out almost entirely in hospitals in Iran, the author repeatedly found severe illness caused by worms and especially by *Ascaris*. He found that the average percentages of persons in rural areas infected with worms were:

	Mazanderan	*Khuzistan*
Ascaris	45	90
Enterobius	25	30
Taenia	18	35
Ancylostoma	25	0

Usually there were were more or less marked mixed infections. Ascariasis was generally cured with ascaridole (containing oil of chenopodium) and Bedermin (a mixture of ascaridole and seretin, a carbon tetrachloride preparation), the doses recommended by the makers of these two preparations (Bayer) being generally used, although they were sometimes exceeded without severe complications. In almost every case a massive expulsion of worms was obtained, but in some cases worm eggs were found after treatment and the treatment was repeated. New infections occurred after a few weeks. The author discusses some factors favouring re-infection that do not apply to Europe.

Treatment in Iran is not in accord with specialist knowledge. Usually santonin is given and in doses far below those normally given. Microscopic identification of the infections is rarely done, so that errors of diagnosis occur and cause difficulties. The author discusses, for instance, the differential diagnosis between appendicitis and worm-ileus. Difficulties are also caused by the fact that patients may have to go some distance to a hospital and do not like going there, so that errors of diagnosis may result in disease so severe that the surgeon cannot save the patient. An example is given of a patient with marked oedema of the ileum and adjoining mesentery with *Ascaris* in the gut, 120 of which were removed. In several cases the author found that small, immature *Ascaris*, about 3–4 cm. long, in the appendix were the original cause of abdominal inflammation. In one case there was perforation of the intestine and several *Ascaris* had wandered into the peritoneal cavity before the operation was done.

The abuse of opium can also lead to difficulties. The paralysis of the intestine caused by it may hinder treatment and may lead to postoperative disturbances. The poor diet also causes difficulties. Often the patients came to hospital so late and in such a condition that the usual drugs, which are toxic, could not be given. Perhaps treatment of such patients with proteolytic enzymes would be less dangerous. *G. Lapage*

Hoekenga, M. T. **Experiments in the Therapy of Human Ascariasis.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 755–61.

The author has conducted a series of experiments to find an efficient, well-tolerated and cheap drug that could be used for mass treatment of ascariasis in labour forces in the tropics. The criterion of cure adopted was complete absence of roundworm eggs on examination of the stools by the zinc sulphate flotation method 10 days and again 2 to 4 weeks after the

completion of treatment. He recapitulates his previous experience with diethylcarbamazine [see this *Bulletin*, 1952, v. 49, 425, 1139].

Sodium santoninate was given to 189 persons with roundworm infection in flavoured cascara syrup in various dosage schemes. With single doses of 500 mgm. a cure rate of 35·7 per cent. (of 28 adults) was obtained and with a daily dose of 250 mgm. for 6 days a cure rate of 53·3 (of 15 adults) was obtained. Even with larger doses no toxic symptoms were observed, so that the author considers that this drug warrants further trial.

In 8 cases, Nematolyt was given; this is a proprietary preparation made from the tropical melon tree, *Carica papaya*, and is reputed to have a lytic action on the keratin coat of nematodes [see also this *Bulletin*, 1954, v. 51, 1275]. All 8 persons had a triple worm infection, *Ascaris*, hookworm and *Trichuris*; after treatment, in 4, 5 and 8 instances, respectively, the infecting worm survived.

Hexylresorcinol monoacetate was given to 89 patients in various dosages. This drug, unlike hexylresorcinol, can be taken in liquid form without injury to the mucosa. With single and small dosages the highest cure rate was 15 per cent., but 6 adults received 3 grammes daily for 4 days and of these 4 were cured; none suffered any toxic effects.

Hexylresorcinol in the form of " Crystoids " was given in the recommended dosage to 80 persons; a single dose of 1 gramme for adults produced a cure rate of 42 per cent.

Oil of chenopodium in a mixture containing 1 minim of the oil per ml. was given to 80 persons (adult dose 15 ml.) on a fasting stomach; 40 per cent. were cured.

The author concludes: " None of the results are considered outstanding, but some are encouraging. Of the various single-dose treatments, hexylresorcinol gave the best results with only 42 per cent. cures, the chenopodium mixture was next with 40 per cent. cures, and the 500 mg. sodium santoninate dosage next with 25·7 per cent. [shown as 35·7 in text and tables]. Of the several multiple dose schedules described, diethylcarbamazine in the amount of 12 mg./pound/day for 4 days was the most promising (80 per cent. cures) and sodium santoninate in the amount of 250 mg. daily for six days was next with 53·3 per cent. It would seem that in Honduras at least, there is a real need for a more efficient ascaricidal agent ". *L. E. Napier*

Brown, H. W. & Sterman, M. M. **Treatment of** *Ascaris lumbricoides* **Infections with Piperazine Citrate.** *Amer. J. Trop. Med. & Hyg.* 1954, July, v. 3, No. 4, 750–54. [10 refs.]

Treatment with piperazine citrate was given to 23 New York children with *Ascaris* infection. The result was checked by egg counts (Stoll's dilution method) before and 2 to 3 weeks after treatment. The dosage was that used by the authors in the treatment of threadworm infections, namely, to children of 15 to 30 lb.—2·5 ml. (½ teaspoonful) of piperazine citrate, " Antepar " (equivalent to 500 mgm. piperazine hexahydrate daily); to those of 31 to 60 lb.—5·0 ml.; and to those of 61 lb. or more—10·0 ml., in all cases twice daily for 3 to 7 days. The dosage was given without previous fasting and no subsequent purging was carried out. In 12 cases the drug was given twice daily by school teachers, but in the other 11 by parents at home. In the former there was every reason to believe that the dosage was regular and accurate, but in the latter there is some doubt.

One child only received 3 days' treatment; in this child the egg count was reduced from 8,100 eggs per ml. of faeces to 500, a reduction of 94 per

cent. Three received 4 days' and 8 received 5 days' treatment; all these were completely cured. The 11 children who were treated at home all received 7 days' treatment; 8 were completely cured; in the other 3 the counts were reduced from 36,300 to 400 per ml., 7,600 to 2,800, and 8,100 to 1,200, respectively.

The authors conclude that " clinical trials with piperazine citrate syrup indicate that it possesses great activity against *Ascaris lumbricoides*. The preparation is highly acceptable to children, easily administered, and requires no fasting period ". [See also this *Bulletin*, 1954, v. 51, 86, 423.]

L. E. Napier

White, R. H. R. **Ascariasis treated with Piperazine Hydrate.** *Lancet.* 1954, Aug. 14, 315–16.

The author reports on three cases of ascariasis successfully treated with piperazine hydrate, which suggests, in his opinion, that this remedy deserves investigation on a larger scale. Piperazine has already been used successfully by Fayard (*Thèse, Paris.* Abstr. *Semaine des Hôpit. de Paris,* 1949, v. 35, 1778), who was the first to use it for ascariasis, by Mouriquand *et al.* (*J. Méd. Lyon*, 1951, v. 32, 189), and by Turpin *et al.* (*Thérapie*, 1952, v. 7, 108).

The author's first patient was a boy aged 3 years, who passed two roundworms in May 1953 and was given a four-day course of mepacrine, after which he passed a third worm. Faecal specimens were not available, but barium studies showed the presence of roundworms in the small intestine. There was no eosinophilia and the blood-count was normal. He was given, as an out-patient, " piperazine hydrate syrup, receiving 0·5 gm. twice daily (68 mg. per kgm. per day) for ten days ". On the second and third days he passed 34 worms which were apparently dead. Eight weeks later he had not passed any more and barium studies failed to reveal roundworms in the small intestine.

The second case was that of a boy aged 2½ years who had passed 9 roundworms in 9 months. The faeces contained many eggs of *Ascaris lumbricoides*, *Enterobius vermicularis* and *Trichuris trichiura* and barium studies showed roundworms in the small intestine. There was no eosinophilia. He was given in hospital the high dose of piperazine hydrate syrup, *i.e.* 1 gm. twice daily for 7 days (130 mgm. per kgm.), which was well tolerated. On the second day 9 worms were expelled [the species of worm is not stated] and 6 stools examined on consecutive days after completion of the treatment showed no eggs of *Ascaris*, but the eggs of *T. trichiura* were present in 5 of these stools.

The third patient was a boy aged 4½ years who passed several worms during the Spring of 1953. He was given santonin, 1 grain, but continued to pass worms and his stools showed many eggs of *A. lumbricoides*. During September he was again given santonin and calomel, ½ grain of each daily for 3 days. Two weeks later he passed another live worm. From October 15th he had piperazine hydrate 0·5 gm. daily for 3 days (81 mgm. per kgm. per day). After three doses he passed 11 worms in one bowel motion. Fifteen and 32 days after this treatment the stools had no eggs of *Ascaris*, but in the first of these stools the eggs of *T. trichiura* were present.

In Britain ascariasis is usually a light and harmless infection, but it may cause unpleasant symptoms and it is best to treat it. As the first case showed, it is well to assume that when there is one *Ascaris* others are present. The aim of treatment is to kill or intoxicate the worms so that they are expelled. If they are merely irritated, they may wander and

may enter and occlude the common bile duct or perforate the intestinal wall. Santonin, tetrachlorethylene and oil of chenopodium are toxic and somewhat unreliable and hexylresorcinol may irritate the gut; and with these three drugs starvation usually precedes treatment and purging follows it. Such treatment is best given in hospital. Piperazine hydrate has little toxicity and the cases described above did not require either starvation or purging, although a mild saline purge might be advantageous. STANDEN (personal communication to the author) observed that exposure of pig *Ascaris* to an increasing concentration of piperazine in fluid culture caused the worms to become progressively more torpid without showing an initial phase of irritability and that with higher concentrations the worms became totally inert, although they were still metabolizing. White concludes that, *in vivo*, piperazine keeps the worms passive while they are moved along the gut and finally ejected. This view is supported by his observation that the worms passed out, although they were motionless and apparently dead, were intact and of normal colour. The rapid action of piperazine *in vitro* accords with their early evacuation by the patient and it may yet be shown that the period of treatment can be reduced to 3 days or less. *Trichuris trichiura* is apparently unaffected by piperazine, as MOURIQUAND *et al.* (*loc. cit.*) and TURPIN *et al.* (*loc. cit.*) also found.

[*Cf.* the use of papain for the treatment of infections with *Trichuris trichiura* by MACCARTHY, this *Bulletin*, 1954, v. 51, 623, who in the same paper records the removal of *Ascaris* also by this enzyme and refers to other reports of its efficacy against *Ascaris*, *e.g.*, JONXIS and BEKIUS, *ibid.*, 1954, v. 51, 79.] *G. Lapage*

DAVIES, M. T., FORREST, J., HARTLEY, F. & PETROW, V. **Piperazine Adipate: a New Anthelmintic Agent. Part I. Physicochemical Properties.** *J. Pharmacy & Pharmacol.* London. 1954, Oct., v. 6, No. 10, 707–10, 1 fig. [14 refs.]

CROSS, B. G., DAVID, A. & VALLANCE, D. K. **Part II. Toxicological and Pharmacological Studies.** *Ibid.*, 711–17, 5 figs.

SLOAN, J. E. N., KINGSBURY, P. A. & JOLLY, D. W. **Preliminary Trials with Piperazine Adipate as a Veterinary Anthelmintic.** *Ibid.*, 718–24.

I. Piperazine and its derivatives (diethylcarbamazine) have recently been used in the treatment of helminth infections. The present authors have sought a salt of low solubility which would be less rapidly absorbed and more stable than some of the preparations (hydrate and citrate) hitherto used. Piperazine adipate was found to possess the requisite pharmacological properties [see below] and was comparatively non-toxic. Extended clinical trials have shown that it eliminated threadworms in human patients, and it also proved curative in a number of helminth infections in animals. The salt is non-hygroscopic, is soluble in water to the extent of 5 per cent., lacks water of crystallization and may be subjected to a temperature of 100°C. for a time without change. Details of other physical properties are also given.

II. In the toxicological and pharmacological studies, acute and subacute oral toxicity tests were made in rats and mice with gum-acacia suspensions. The adipic acid salt proved less toxic than the hydrate. The LD50 in mice and rats was 11·4 and 7·9 gm. per kgm. respectively. At the higher dose levels the rats became lethargic and many had diarrhoea. There were no immediate deaths. In the subacute oral toxicity tests no gross pathological lesions were found at the end of experiment. The action on smooth muscle

in cat, rabbit and guineapig provided an increase in tone and frequency of contraction. A fall in blood pressure resulted from rapid intravenous injection of the drug in cats. Moderate doses generally produced only small cardiac, circulatory or respiratory responses. The effect of the drug on the haemopoietic system of rabbit was negligible. Local necrosis at the site of drug inoculation was encountered.

III. As a result of the success of diethylcarbamazine treatment in worm infections reported by Hewitt *et al.* [this *Bulletin*, 1948, v. 45, 455] attention was focussed on other piperazine derivatives which, because of their cheapness, could be used in the treatment of domestic animals. It was soon found that piperazine adipate was useful against ascarids in dogs, horses, pigs, felines and poultry, and some results obtained in the treatment of these infections as well as of other species of nematodes in different hosts are recorded. The drug was given orally in suspensions, mixed with food or in gelatin capsules. To test the efficiency of the drug counts were made of the number of worms expelled and of those remaining when the animal was sacrificed. If the animal could not be sacrificed faecal egg counts were made before and after dosage. The efficiency, wide margin of safety, easy administration and lack of toxicity of piperazine adipate in the treatment of ascariasis provide many advantages over the drugs in current use. Control of some hookworm and other helminth infections also appears feasible. *J. D. Fulton*

Talyzin, F. F. **The Oxygen Treatment of Ascariasis.** *Lancet.* 1954, Aug. 14, 314–15, 2 figs.

In the Soviet Union a search has been made for methods of treating ascariasis that are less harmful than the use of santonin and a method now widely used is treatment of these infections with oxygen, which was recommended by Kravetz [no ref.]. The patient is given an enema before breakfast and, after evacuation of the bowel, a duodenal tube is passed, preferably through the nose, into the stomach; oxygen, under " slight pressure ", is passed in for 7–15 minutes, with brief intervals. Borborygmi and a sensation of increasing fullness indicate that the oxygen soon reaches the small intestine. If belching, nausea or pain occur, the oxygen is stopped, but the tube must on no account be removed. After a minute or two the oxygen is started again and is continued until there is uniform distension and tympanites over the whole abdomen. The usual dose of oxygen for an adult is 1–2 litres.

After two hours a saline aperient is given, *e.g.*, $MgSO_4$. Three hours later the patient may have a normal meal. The *Ascaris* are usually passed dead in the stool on the second or third day, or more rarely during the first, or more rarely still on the fourth day. The equipment used is described and shown in line drawings. It consists of an oxygen cylinder which fills an oxygen pillow which delivers the oxygen to two aspirator bottles, from the second of which the oxygen passes into the duodenal tube. The author claims that the procedure is simple, safe and painless and does not lead to complications. All the oxygen is absorbed from the intestine in 2–3 hours. The pulse usually slows, but the blood pressure is unchanged. Eructations and the passage of flatus are rare. The method has been used for out-patients and large numbers of people can be treated by it quickly. It is claimed that larvae in the eggs of the *Ascaris* do not develop. [*Cf.* the treatment of infections with *Taenia saginata*, by Wigand and Warnecke, (this *Bulletin*, 1954, v. 51, 196) by introduction of oxygen into the duodenum.] *G. Lapage*

Rachou, R. G. Índices epidemiológicos em inquéritos de filariose bancroftiana. [**Epidemiological Indices in Filariasis Surveys** (*W. bancrofti*)] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1954, Jan., v. 6, No. 1, 41–51. English summary.

The English summary appended to the paper is as follows:—

" The author defines several epidemiological *indices* that may be used in bancroftiasis surveys. He thinks that the names ' filarial disease rate ', ' filarial infection rate ' and ' endemic rate ', usually employed respectively, for the percentage of persons with clinical symptoms, the percentage of persons with microfilariae in the blood and the percentage of persons with any manifestation of bancroftiasis (clinical symptoms or microfilariae) are improper, proposing the new expressions ' clinical rate ', ' microfilariae rate ' and ' infestation or filariasis rate '. He presents two new entomological *indices*: ' domesticity rate ' (percentage of houses with *Culex fatigans* multiplied by the average number of *Culex fatigans* by house) and the ' general rate of transmission ' (domesticity rate multiplied by the natural infestation rate of *Culex fatigans*). The *indices* usually established in the epidemiological surveys of the Filariasis Program in Brazil are registered."

Lieske, H. Filariasis en Puerto Limón, Costa Rica. [**Filariasis in Port Limón, Costa Rica**] *Rev. Biologia Trop.* San José, Costa Rica. 1954, July, v. 2, No. 1, 37–43, 5 figs. & 2 plans.

The English summary appended to the paper is as follows:—

" In 1953 the inhabitants, mostly coloured, of 25 houses in one city block in the Jamaicatown quarter of Port Limón, situated on the coast of the Caribbean sea in Costa Rica, were examined for filariasis. Out of 137 patients examined, there were 21 positive cases of microfilariae of *Wuchereria bancrofti*, fluctuating between 1 and 289 per 20 mm³ blood.

" Among those 21 positive cases there were 5 showing insignificant tumefactions of the inguinal glands, and one patient showing slight oedema of the foot; the rest had no pathological signs. No elephantiasis was observed.

" In comparison with the results obtained by Butts in Jamaicatown in 1946, no decrease of filariasis could be observed among the inhabitants.

" Among the mosquitoes caught at Jamaicatown, *Culex fatigans* is the dominant species. This mosquito is known to play an important role in the transmission of filariasis."

[See this *Bulletin*, 1948, v. 45, 352.]

Nicholas, W. L. & Kershaw, W. E. **Studies on the Intake of Microfilariae by their Insect Vectors, their Survival, and their Effect on the Survival of their Vectors. III.—The Intake of the Microfilariae of** *Acanthocheilonema perstans* **by** *Culicoides austeni* **and** *C. grahamii*. *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 201–6. [13 refs.]

Hopkins and Nicholas [this *Bulletin*, 1953, v. 50, 1069] compared the infection rates of *Culicoides austeni* and *C. grahami* with the microfilariae of *Dipetalonema perstans* and found that they were much higher in *C. austeni* than in *C. grahami*. To find out whether this was due to a difference in the number of microfilariae taken up by the 2 species of midges or to a lower survival rate of the microfilariae in *C. grahami*, the

authors of the present paper fed groups of the 2 species on a "fly boy" infected with microfilariae of *D. perstans*. The actual number of the parasites taken in was then compared with the number expected to be ingested. In similar investigations [*ibid.*, 1954, v. 51, 83, 963], the weight of the blood meal taken by the insects used in the experiments was determined by weighing them before and after feeding. But in the present studies this was impracticable because of the small size of the midges; the blood volume was therefore estimated from the linear measurements of the midgut, a method which, as the authors admit, has limitations.

The results showed that *C. austeni* took in more than the expected number of microfilariae, whereas in the single group of *C. grahami* dissected after the infective feed, the actual number taken in was only 3 as against the expected 7. It has been shown that *C. grahami* takes in only about one-third of the amount of blood ingested by *C. austeni*; this difference, according to the authors, is too small to account for the difference in the infection rates, which they think is due to a lower survival rate of the microfilariae in *C. grahami* rather than to the smaller number of parasites ingested by this species.

There is nothing to suggest that *C. grahami* is not a vector in nature, but the fact that while naturally infected *C. austeni* have been collected from the British Cameroons, no such *C. grahami* have been found, is significant. *M. G. R. Varma*

Rosen, L. **Observations on *Dirofilaria immitis* in French Oceania.** *Ann. Trop. Med. & Parasit.* 1954, Sept., v. 48, No. 3, 318–28, 2 figs. [19 refs.]

Crewe, W. **Studies on Ethiopian *Chrysops* as possible Vectors of Loiasis. I.—*Chrysops langi* Bequaert.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 216–19.

The most important vector of loiasis in man at Kumba in the British Cameroons is *Chrysops silacea*, although the microfilariae of this worm have been shown to undergo development in *C. dimidiata*, *C. distinctipennis* and *C. longicornis* also.

As a result of his experiments the author was able to show that the microfilariae can develop into mature infective forms in females of yet another species, *C. langi*, which he bred from larvae and pupae collected from the bed of a stream in Kumba. It is interesting to note, however, that microfilariae of *Dipetalonema perstans* did not seem to undergo any development at all in this species.

Only 3 specimens of *C. langi* have so far been collected in nature from Kumba, all of them from the forest canopy, about 50 ft. from ground level [this *Bulletin*, 1951, v. 48, 907]. As about one-third of the *Chrysops* which the author bred from larvae and pupae in this region consisted of *C. langi*, he presumes that this species is present in fair numbers in the forest canopy and although rarely attacking man, may play a part in the transmission of filarial parasites of monkeys.

Contrary to the generally accepted view, the author found that the females of *C. langi* and also *C. silacea*, *C. dimidiata*, *C. griseicollis* and *C. maximus*, took a blood meal before mating; however, eggs laid by such *C. langi* did not develop further. *M. G. R. Varma*

Crosskey, R. W. **Infection of *Simulium damnosum* with *Onchocerca volvulus* during the Wet Season in Northern Nigeria.** *Ann. Trop. Med. & Parasit.* 1954, June, v. 48, No. 2, 152–9. [12 refs.]

The high incidence of onchocerciasis in man (33 to 85 per cent.) in the neighbourhood of Kudaru in the Zaria Province of Northern Nigeria, led to the present investigations on the infection of *Simulium damnosum* with *Onchocerca volvulus* in this area.

The rapids of the Galma river, which flows near Kudaru, were the breeding places of these flies. A total of 1,680 flies were caught from this area and dissected during the wet months (June to October) of 1953; 19·7 per cent. of these flies were found to be infected, of which 11·6 showed developing forms of the parasite, 6·4 harboured infective larvae, and the rest, 1·7 per cent., had both developing and infective forms, indicating that they might have had two infective feeds. In the majority of flies, developing forms were found in the thorax only, although infective forms were found in other regions of the body also. The greatest number of infective larvae were usually found in the head and thorax.

Distance from the breeding ground did not seem to lower the infection rate which was almost the same at the breeding site and at distances of 2·5 miles, 3·5 miles and 4 to 7 miles; however, the author has pointed out that the number of flies dissected (100) away from the breeding site is too small for any definite conclusions to be drawn.

There seems to be no correlation between population density as determined by number of flies biting and infection rate, for example, when the number of flies caught per fly-boy-hour (biting per boy-hour) was 14·3, the infection rate was 20·2, but a drop in the number of flies caught per fly-boy-hour to 2·0 was not accompanied by a lowering of the infection rate; in fact it went up to 32·2 per cent. Similarly, although greater numbers of flies were caught after flooding of the Galma river, the infection rate in flies caught one day after flooding remained as low as 8·5 per cent. whereas during times of normal rainfall it was 21·9. The higher catches made after excessive rainfall, the author thinks, were due to an increase in the fly population rather than to an enhanced readiness on the part of the flies to bite man. By the method of estimating the age of flies by the wear and tear of the mesonotal pubescence, the author was able to show that the majority of flies caught one day after flooding were very young. He suggests, therefore, that the low infection rate among such young flies is due to their not having fed before the time of capture.

Parasitic ciliates, chalcid larvae and nematodes other than *O. volvulus* were found inside the bodies of some of the flies, and two of them were infested with an unidentified mite. *M. G. R. Varma*

Morales Cisneros, A. Dietilcarbamazina en la oncocercosis. Notas sobre su dosificación en los tratamientos de campo. [**The Treatment of Onchocerciasis with Diethylcarbamazine. Dosage for Field Treatment**] *Medicina.* Mexico. 1954, Aug. 25, v. 34, No. 706, 377–83.

This is an interesting record of a carefully planned piece of experimental research. The workers were engaged in coffee plantations in Chiapas. In 1948 Mazzotti and Hewitt [see this *Bulletin*, 1948, v. 45, 532] started with 2 mgm./kgm. diethylcarbamazine daily in divided doses morning and evening, increasing gradually to 3 times this dose It was found difficult, however, to prevail on the patients to attend twice daily and the author during the last 3 years has tried different schemes of treatment, giving the

drug once a day only: in Chiapas 5 mgm./kgm. daily for 10 days; in Oaxaca 4, 6 and 10 mgm./kgm. daily for 10 to 15 days. He also compared the results in those who had had nodules extirpated with others who had not.

Dealing first with those who had had extirpation: to a group of 55 patients was given a daily dose of 5 mgm./kgm. for 10 days. Biopsy of skin sections after the course showed 39 (stated as 70·9 per cent.) negative, 11 (20 per cent.) with fewer microfilariae, and 5 (9·1) unchanged. Sixty-three were given 10 mgm./kgm. daily for 5 days and after this 42 (66·6) were negative. 14 (22·2) showed diminution in the numbers of microfilariae and 7 (11·1) unchanged. To 139 were given 5 mgm./kgm. daily for 5 days; 93 (66·9) were then negative, 29 (20·9) had fewer and 17 (12·2) were unchanged.

Next, those who had not had nodules extirpated: eighteen received 5 mgm./kgm. daily for 10 days, after which 8 were negative, 9 had fewer microfilariae and 1 was unchanged (stated as percentages 44·4, 50 and 5·5). Twenty-nine received 5 mgm./kgm. daily for 5 days and 13 (44·8) were then negative, the same number showed diminution and 3 (10·3) remained unchanged. [There was no group corresponding to those of the first series receiving 10 mgm./kgm. daily for 5 days.]

It will be seen that on the whole the drug was very beneficial and better in those who had had nodules extirpated prior to administration of the drug; the 10-day treatment gave the best results of all. The other ocular symptoms also improved, usually after the 3rd or 4th day of treatment.

H. Harold Scott

Cooray, G. H., Yoganathan, M. & Dissanaike, A. S. *Enterobius vermicularis* **in a Suppurating Cyst of the Female Breast.** *Ceylon J. Med. Sci.* (Sect. D.) 1954, Apr., v. 8, Pt. 4, 199–201, 6 figs. on 3 pls.

The authors refer briefly to records of *Enterobius* in unusual situations [this *Bulletin*, 1951, v. 48, 748; 1953, v. 50, 55] but have found no record of its presence in the female breast.

They report the case of a woman of 42 in Ceylon with an epidermoid cyst of the breast, which broke down and discharged for a month after operation. Histological examination revealed a recent haemorrhage in which was embedded a mature female *Enterobius* and several ova. The means of identification and the tissue changes are described and the appearances are illustrated in 6 photomicrographs.

The authors discuss the possible mode of entry of the nematode and give reasons for suggesting that a mature female worm had entered a " punctum " which was visible in the skin of the patient. This probably occurred through accidental contamination of the skin either by the patient's infected fingers or from peri-anal skin of an infected child which she may have carried. No helminthic ova or other parasites were found in the patient's stools.

H. J. O'D. Burke-Gaffney

Friedrich, Eva. Innenkörperanämie nach phenothiazinhaltigen Wurmmitteln. [**" Inclusion Body " Anaemia after Administration of Drugs containing Phenothiazine**] *Med. Klin.* 1954, July 30, v. 49, No. 31, 1222–3.

The author records toxic, haemolytic anaemia caused in two female children, one aged 3 years 10 months and the other 4 years 11 months,

by taking " worm-chocolate ". [For similar cases, see this *Bulletin*, 1954, v. 51, 624, 964.] The full symptom-complex of this condition is, the author states, cyanosis, subicterus, enlargement of the spleen, dark urine (rarely haemoglobinuria or porphyrinuria), anaemia with morphological changes and leucocytosis.

In the two cases reported there was no cyanosis, but the anaemia could be distinguished from other forms of anaemia by the presence of inclusion bodies, the spontaneous formation of which occurs, according to GASSER, only in prematurely-born children and in aplasia of the spleen. In general the prognosis of this form of anaemia is good and it can be treated with the usual drugs and with blood transfusion.

Details of the clinical examinations of the two children are given. The girl aged 3 years and 10 months had had a two-day course of Helmetina worm-chocolate bought from a chemist without a medical prescription. Two days after this course, which was given " because of ascariasis ", the child showed languor, vomiting, increased need of sleep and loss of appetite and weight. The skin and mucosae showed marked pallor and there were haemorrhages. The spleen was not palpable, but the liver extended two fingerbreadths below the costal margin. Features of the blood-examination were: haemoglobin 20 per cent., erythrocytes 1·26 million per cmm., leucocytes 58,800 per cmm., with microspherocytes, anisocytosis, polychromasia and other features for which the original paper must be consulted. Vital staining of the erythrocytes showed inclusion bodies. In the urine the urobilinogen was increased. After a blood transfusion and appropriate medical treatment, the blood picture became normal in 2½ weeks. The girl aged 4 years 11 months had also been given Helmetina worm-chocolate. During the treatment retching occurred and the urine was red for 2 days. The treatment caused the expulsion of 2 *Enterobius*. Neither the liver nor the spleen was enlarged. Among details of the blood-examination given are: haemoglobin 50 per cent., erythrocytes which showed inclusion bodies by vital staining, 2·3 million per cmm., leucocytes 4,400 per cmm. and anisocytosis and polychromasia. There was no increase of bile pigments in the urine, but worm eggs [unspecified] were found. The blood picture became normal in 2½ weeks after medical treatment without a blood transfusion.

The author recommends that, in view of the possible severe effects of remedies containing phenothiazine, these preparations should be supplied only on a medical prescription and with clear indications as to their use, especially if doses of them are to be repeated. Especial care is needed with worm-chocolate, the taste of which is good so that the risk of overdosage is increased. [The author gives no reference to the work of GASSER quoted above and it is not clear where this condition *innenkörperanämie* is intended to be classified within the anaemias.] *G. Lapage*

SILWER, J. Trichinos. [**Trichinosis**] *Nordisk Med.* 1954, Sept. 9, v. 52, No. 37, 1278–9.

The English summary appended to the paper is as follows:—

" A brief survey is presented, dealing with the occurrence of trichinosis in Sweden, its commonest symptoms, diagnosis, prognosis and treatment.

" Three cases with a typical symptomatology are reported. The diagnosis was established by muscle biopsy before a positive serologic reaction could be expected. The precipitin reaction ad modum ROTH was positive in each case. In one case the condition was fairly severe and the course

prolonged; cortisone therapy was instituted in the acute stage and had a salutary effect."

Stoner, R. D. & Godwin, J. T. **The Effects of Adrenocorticotrophic Hormone and Cortisone upon Acquired Immunity to Trichinosis in Mice.** *Amer. J. Path.* 1954, Sept.–Oct., v. 30, No. 5, 913–18. [12 refs.]

"Cortisone treatment of mice immunized by active infection of *Trichinella spiralis* and challenged with Trichinella larvae produced a significant breakdown of their acquired immunity to re-infection. Daily administration of ACTH to immunized and challenged mice effected a slight but not significant increase in mortality rate over that observed in untreated control animals.

"Combined treatment of immunized and challenged mice with antibiotics and cortisone failed to prevent the depressing effect of cortisone upon acquired immunity to Trichinella infection. Pathologic study revealed no significant ulceration or inflammatory reaction about the adult worms in the intestine of cortisone-treated and untreated animals."

[See this *Bulletin*, 1954, v. 51, 89.]

DEFICIENCY DISEASES

de Meira, M. T. V. Contribuição para o conhecimento do estado de nutrição da população de Cabo Verde. Resultados, comentados, dum inquérito realizado na Ilha do Sal, em 1949. [**Nutritional Studies of the People of Cape Verde**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1199–232, 2 graphs & 7 figs. English summary.

de Figueiredo, J. M. P. Contribuição para o estudo do problema de alimentação na Índia Portuguesa e a sua influência sobre a saúde. [**Nutrition in Portuguese India and its Influence on General Health**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1233–317. [Refs. in footnotes.] English summary.

This is a study of the food and food-values among the schoolchildren and students and ordinary labourers in Goa. The composition of certain articles and constituents of the food is given, from which it is seen that the deficiency is not in proteins and fats but rather in vitamins A, B_1, B_2 and C, and in calcium and iron. The malnutrition is also due to the prevalence of intestinal parasites. The author quotes Froilano de Melo's figures of nearly 30 years ago and gives his own more recent findings as the result of examination of the faeces of 50 students. *Ascaris* was present in 37, *Trichuris* in 32, hookworm in 12, *Strongyloides* in 1; *E. coli*, vegetative forms in 8, cysts in 7, *E. histolytica* in 2 and 3 respectively, *E. bütschlii* in 1; *Chilomastix* in 3, *Blastocystis* in 3, *Trichomonas* in 3, *Enteromonas* in 2, *Giardia* cysts in 1. Four of the students' diets are discussed and 14 of those of the general labouring classes. Generally the caloric value is not bad. That of the adult male is 2,600, of children 12–13 years old 2,080, of 4–5 years 1,040. Biometric figures are given of 820 students and

120 soldiers, and both showed a retardation of physical development; rickets and dental caries are common among the young and adolescent; infant mortality reached 12 per cent. in 1951. In primary schools nearly 700 children were examined and some 50 per cent. of them showed evidence of vitamin deficiency in the form of phrynoderma, rhagades and fissuring of the tongue, while intestinal parasites of one sort or another were seen in three-fourths of those examined. The article contains many informative tables. *H. Harold Scott*

Lal, S. B. **Changes in Dietary Habits and Physique of Aboriginals in Santhal Parganas, a District of Bihar.** *Indian J. Med. Res.* 1954, Apr., v. 42, No. 2, 167–79, 1 graph.

This paper records the results of a dietary survey carried out in 1951–52 on some aboriginal tribes in Bihar and compares the results with a survey previously conducted in 1938–1939. During the interval there appears to have been some slight decline in the birth rate and the number of children per family was reduced. The cash price of various foods had gone up by from 200–500 per cent., but cash incomes had risen slightly more. Intake of cereals (mostly rice) was up from an average of 16·7 oz. per consumption unit per day to 22·3 oz. Intakes of pulses, vegetables, fats and oils, flesh foods, milk, fruit and nuts were mostly unchanged and very low. The heights and weights of both boys and girls were slightly higher than in 1938–1939. A clinical assessment of the children showed that defects due to lack of nutrients, such as vitamin A, carotene and riboflavin, were observed in a greater percentage of children in the recent survey. The increased purchasing power of the parents had thus led to no improvement in the quality of the children's diet. Any increase in the family income was only too frequently dissipated on alcoholic drinks. *R. Passmore*

South Pacific Commission. Noumea, New Caledonia. **Dietary and Nutritional Problems in the Pacific** [Massal, E.]. *Technical Paper No. 59.* 1954, May, mimeographed pp. iii + 13, 1 map. [2s.]

This brief account of the life of Pacific islanders, separated from each other by many thousands of miles, makes interesting reading. The traditional diet on most of the islands consists of fish, bananas, bread fruit, taros, sweet potatoes, yams, fruit, green vegetables and coconuts. The islanders are capable fishermen and agriculturists, but use very primitive methods. However, copra, vanilla beans, cane sugar, cocoa, mother-of-pearl shells and other economically valuable products can be grown instead of food on many of the islands. When world trade is good, many of the islanders are diverted from subsistence agriculture to cultivating cash crops. With the money earned they buy white bread, polished rice, white sugar, canned meat and fish, preserves, tea and alcoholic drinks. Some communities appear to have changed their mode of life more than once in accordance with economic tides. The islanders appear to be an adaptable people. There is little evidence of deficiency diseases, but their diets are often far from what orthodox textbooks of nutrition would consider desirable and general morbidity and mortality are high. There is clearly much need for nutrition education and especially for education in mother-craft and the preparation of infant foods. But, as the author points out, conditions vary so much in different islands that generalizations are difficult.

[Dr. Massal clearly has a very wide knowledge of the Pacific and can see the problems of the islanders in perspective. This technical paper is very brief and really only whets the reader's appetite. A full monograph on nutrition in the Pacific would be a fascinating book.] *R. Passmore*

Food and Agriculture Organization of the United Nations. **FAO Nutrition Meetings Report Series No. 8.** Report of the Third Conference on Nutrition Problems in Latin America, Caracas, Venezuela, 19–28 October 1953. pp. iv + 60. Rome: 1954, June. [$0.50; 2s. 6d.]

The conference was concerned mainly with protein malnutrition and endemic goitre, although other subjects such as school feeding, diet surveys, nutrition education and food enrichment were briefly considered. Readers of this *Bulletin* will learn nothing new about protein malnutrition from the report. The characteristic features are essentially the same in Latin America as in Africa or other parts of the world. The delegates considered the terms "*sindrome pluricarencial infantil*" and kwashiorkor to be synonymous and, perhaps naturally, prefer the former.

The report gives an excellent summary of the importance of endemic goitre in causing disease and ill-health in isolated rural communities. As the condition can be prevented by providing an adequate supply of iodine, its elimination might at first sight appear to be a very simple matter. In practice the distribution of iodine either through table salt or in drinking water or otherwise has proved to be extraordinarily difficult. The conference recommended that salt for human consumption should be iodized in countries in which endemic goitre is a public health problem. The practical difficulties in putting this recommendation into effect are discussed in the report. *R. Passmore*

Reh, Emma, with the collaboration of Aurora Castellanos & Yolanda Bravo de Rueda. Estudio de la dieta y de las condiciones de vida existentes entre los trabajadores de una plantación azucarera de Guatemala. [**A Study of Living Conditions and Diet among Workers on a Sugar Plantation in Guatemala**] *Bol. Oficina Sanitaria Panamericana.* 1954, July, v. 37, No. 1, 32–52. [13 refs.]

The English summary appended to the paper is as follows:—

"1. A survey was made of economic and social conditions and of food consumption on a sugar plantation in a rural area of Guatemala.

"2. The economic situation of the plantation workers was found to be at a low level, and their salaries, combined with other benefits, appeared inadequate to meet their needs. Community spirit was lacking, as was a satisfactory cultural pattern, since the majority of the workers were employed on a temporary basis.

"3. The dietary survey showed deficiencies in the consumption of animal protein, Vitamin A, riboflavin, and Vitamin C.

"4. Although the dietary studies revealed a relatively low intake of ascorbic acid, the high levels of Vitamin C found in the blood serum suggested that the average intake of this vitamin is adequate.

"5. Clinical examinations showed that dry skin and follicular hyperkeratosis were common. Caries, goiter, anemia and malaria were observed in a certain number of persons. A high percentage of the population suffered from intestinal parasites.

"6. In general, suggestions were made to improve the diet of the workers, as well as their socio-economic conditions."

Zubillaga, A. & Barrera Moncada, G. Síndromes policarenciales en la infancia. (Contribución a su estudio.) [**Deficiency Diseases in Children**] *Archivos Venezolanos Puericult. y Pediat.* 1953, Oct.–Dec., v. 16, No. 50, 473–536, 3 graphs & 8 figs. [21 refs.]

The English summary appended to the paper is as follows:—

"The authors study 144 cases of nutritional deficiency disease in children treated at the Camejo Acosta Childrens Hospital in Barquisimeto from 1940 to 1943. In 30 cases there were made particular clinical, semiological and laboratory observations. They call the attention to the great frequency of this disease in certain parts of the country, specially in the region of Barquisimeto, where out of 995 diagnosed cases, 17% were attributed to deficient nutrition. This disease is one of the most frequent occurrence between the ages one and ten years, among those investigated. No cases were observed below one year of age.

"The study revealed that the deficiencies in caloric values and proteins seem to be the principal etiological factors, and that these are a consequence of the low living and cultural standards present in the social class where the disease is prevalent.

"The most important clinical symptoms found were: retardation in weight and growth, edemas, cutaneous hyperpigmentation, alterations of the mucous membranes and of the hair, nervous and digestive disorders, and special psychic state. The authors measured the bi-iliac and bi-acromial diameters for normal and diseased. In the latter the bi-iliac diameter was always smaller than normal.

"The following laboratory findings are given: changes in the blood plasma and in the blood cells, frequent intestinal parasites (63%) as an intercurrent or coadjuvant element, transversal lines and decalcification shown by X-ray investigation of the extremities of the long bones in 17 cases.

"Finally the authors outline a method of treatment for the general practitioner, based on a high protein diet accelerates the evolution of the case and is at the same time economical."

Charmot, G., Linhard, J., Giudicelli, P. & Trapet, P. Intérêt clinique des perturbations de l'équilibre protidique en pathologie tropicale. Considérations sur la "dysprotéinémie africaine". [**Clinical Significance of Altered Protein Equilibrium in Tropical Practice. Observations on "African Dysproteinaemia**] *Méd. Trop.* Marseilles. 1953, Nov.–Dec., v. 13, No. 6, 961–76.

The authors review technical methods of studying the protein pattern of the blood and results obtained with African blood by various workers. They summarize their own results obtained on 70 subjects who were free from parasites and presumed healthy except for "*affections benignes*", among which they include urethritis, intermittent albuminuria and mycoses. The blood of these subjects was subjected to a battery of flocculation tests and in some cases to paper electrophoresis. They found that the protein equilibrium in the majority of their African subjects (soldiers) differed from that of European soldiers of the same age and living in the same conditions. The African blood showed a moderate reduction of albumin and increase of *gamma* globulins. They point out that these differences must be considered in assessing the value of clinical tests dependent on blood protein pattern.

Further investigations were carried out in Europeans and Africans suffering

from infective hepatitis, cirrhosis (alcoholic in the case of Europeans, "tropical" in Africans), primary carcinoma of the liver (Africans), amoebic hepatitis (Europeans), infantile steatoses, urinary schistosomiasis, malaria, typhoid fever, infective rheumatism (both European and African) and cardiac diseases. Details of results are given and discussed under each condition.

The authors conclude that electrophoresis and flocculation reactions are useful and complementary, the former giving quantitative, the latter qualitative information. The relative importance of other tests is discussed.

There is a discussion on the possible causes of the differences between European and African protein pattern, and it is suggested that hepatic dysfunction and nutritional disturbances may be concerned.

B. G. Maegraith

Busson, F., Trapet, P. & Lecocq, F. Exploration des protéines sériques. Application aux sérums d'Africains de Dakar. [**Study of Serum Proteins in Africans in Dakar**] *Méd. Trop.* Marseilles. 1953, Nov.–Dec., v. 13, No. 6, 977–1001, 12 figs. [125 refs.]

This is an excellent paper which should be read in the original by those interested in the protein patterns of African blood. Techniques are fully described and evaluated. The results are very similar to those of Charmot *et al.* [above], *i.e.*, the African shows a reduction in serum albumin, an increase in *gamma* globulin and a corresponding change in A/G ratio [see this *Bulletin*, 1954, v. 51, 1316].

The possible effects of climate and seasons are discussed and the results are considered in relation to those of other workers, including those who have studied Negro blood in the United States. *B. G. Maegraith*

Waterlow, J. **Disorders of the Liver in Tropical Nutritional Diseases.** *Proc. Nutrition Soc.* 1954, v. 13, No. 2, 135–9. [24 refs.]

Fatty livers are common in the tropics. The infiltration may be extensive and the fat content of the liver is often 40 per cent. of the wet weight. Such fatty livers are, however, only one manifestation of a "protein malnutrition" which affects all the cells of the body. The extent of the fatty deposits in the liver and the rate at which the fat disappears under treatment are probably only secondary factors. The key lesion is the depletion of cell proteins and the rate at which they can be replaced determines the response to treatment. Chemical analyses of material from biopsy samples of 12 cases in Jamaica showed that there was a depletion of some 40 per cent. of the liver proteins; these were replaced under milk therapy.

As there is no means of finding the total liver weight in a living subject, measurements made on biopsy material must be related to deoxyribonucleic acid (DNA) as a standard. [DNA is a characteristic chemical component of the chromosomes in the cell nucleus and the total amount present in a whole liver or per single liver cell nucleus is not significantly altered by drastic changes in the nutritional state of the liver. An excellent summary of modern views on the chemical architecture of the liver cell was given by Davidson in the same symposium, see *Proc. Nutrition Soc.*, 1954, v. 13, 112.] Before treatment the liver content of protein nitrogen in mgm. per mgm. of DNA was 49·7. After treatment the value rose to 80·3. Similarly

the ribonucleic acid phosphorus rose with treatment from 1·05 to 1·59 mgm. per mgm. DNA phosphorus. These figures emphasize the extent of the liver protein depletion that is associated with the fatty infiltration. In the author's opinion the fatty change may be a phenomenon of little importance relative to the main disturbance in protein balance.

Tropical cirrhosis of the liver is very common: it is not a single entity. Although in animals heavy fatty infiltration has been shown to develop into fibrosis, there is no evidence that this is a common sequence in the human child. Fatty liver and cirrhosis have different distributions in the tropics. In the Gambia cirrhosis is common, but not fatty liver. There, both clinical and epidemiological evidence suggest a combination of malnutrition and malaria as a cause of cirrhosis. In Jamaica juvenile cirrhosis is also common and it is possible that toxic factors in bush teas, which are consumed at an early age, acting on a liver with function impaired by a diet low in protein may be responsible [this *Bulletin*, 1952, v. 49, 892; 1953, v. 50, 329].

[This brief but very important paper cannot be adequately abstracted for it is itself a very concise summary of the author's views based on his own biochemical, clinical and epidemiological experience in many parts of the tropics. All interested in this subject are advised to read the original.]

R. Passmore

Achar, S. T. & Chacko, R. **Pathological Changes in the Liver in Hepatic Cirrhosis of Childhood commonly known as Infantile Biliary Cirrhosis.** *Indian J. Med. Sci.* 1954, July, v. 8, No. 7, 442–5, 10 figs. on 2 pls.

Srivastava, J. R. & Aikat, B. K. **Infantile Cirrhosis of Liver. A Clinico-Pathological Study of 45 Cases.** *Ibid.*, 446–57, 19 figs. & 3 charts on 4 pls. [21 refs.]

The introduction of the technique of liver biopsy has greatly facilitated study of this disease. The difficulties of precise diagnosis and the paucity of autopsy material have hitherto handicapped investigators. These two papers, the first from Madras and the second from Gwalior in Central India, both report long series in which biopsy material was available for study. The characteristic histological appearance is a diffuse liver-cell necrosis with some fibrosis and pseudo-lobulation. Evidence of mesenchymal reaction was present even in the early stages. Fatty changes were seldom marked and there was no collagenous exudate or occlusion of the central vein. The condition is therefore quite distinct from the fatty liver associated with protein malnutrition in kwashiorkor or veno-occlusive disease, ascribed to the toxic effects of bush teas in Jamaica [this *Bulletin*, 1953, v. 50, 329; 1954, v. 51, 972].

Infantile biliary cirrhosis is clearly a third distinct important liver disorder of childhood. These papers emphasize its commonness in India. They do not, however, contribute to our knowledge of its aetiology. Srivastava and Aikat confirm previous reports that it is not closely associated with poverty. It appears to be a middle-class disease and there is no evidence of a primary nutritional deficiency. They suggest that a virus may be responsible, but this is a suggestion *faute de mieux* and they bring no positive evidence to support it. More is going to be heard of this interesting disease in the future. These two papers by establishing more firmly the nature of the essential histological lesions are valuable contributions. Unfortunately, in neither of the papers are the numerous microphotographs up to the best modern standards. Many of the reproductions convey little or nothing to the reader.

R. Passmore

Ramalingaswami, V., Sriramachari, S. & Patwardhan, V. N. **Liver Injury in Protein Malnutrition.** *Indian J. Med. Sci.* 1954, July, v. 8, No. 7, 433–41, 20 figs. on 3 pls. [46 refs.]

This paper compares and contrasts the histological features of the liver in 40 cases of human kwashiorkor (biopsy material) with those in over 300 rats which had an uncomplicated protein deficiency as a result of subsisting on diets containing 2 to 7 per cent. protein for periods up to 9 months. In both conditions there was a marked reduction in cytoplasmic basophilia, presumed to be due to a lowered content of ribonucleoprotein, and an increase in alkaline phophatase. These changes could be reversed by treatment with a high protein diet. In the protein-deficient rat liver, fatty infiltration was never severe and there was no evidence of proliferation of mesenchymal elements, whereas these were observed in all the severe cases of kwashiorkor. That the liver injury in kwashiorkor cannot be entirely explained by a simple protein deficiency is the main conclusion.

R. Passmore

i. Williams, Cicely D. **Kwashiorkor.** [Council on Foods and Nutrition (Wilson, J. R., Secretary).] *J. Amer. Med. Ass.* 1953, Dec. 5, v. 153, No. 14, 1280–85.

ii. Monnerot-Dumaine, M. Le kwashiorkor. (Stéatocirrhose carentielle du sevrage.) [**Kwashiorkor: Nutritional Steato-Cirrhosis of Weaning**] Reprinted from *Presse Méd.* 1954, Apr. 10, v. 62, No. 26, 545–6.

i. This article was written at the request of the Council on Foods and Nutrition, and is a terse and clear description of the condition first described by the author in 1933. She writes vigorously, and obviously with authority, and she brings out two points not always remembered, first that the children who suffer from this condition are malnourished not always because of poverty or real shortage of food, but because of deep ignorance of how a child should be fed, and second that the malnutrition is usually complicated by parasitic infections. In the course of the article she discusses the clinical and pathological aspects of the disease, its treatment and prevention.

ii. This also is a general account of the disease which sums up the various points conveniently for readers of the French language.

Charles Wilcocks

Welbourn, H. F. **Signs of Malnutrition among Baganda Children attending Child Welfare Clinics.** *East African Med. J.* 1954, July, v. 31, No. 7, 332–6. [18 refs.]

It has been suggested that kwashiorkor in a mild form affects the majority of African children. Evidence for this statement has been sought in children attending a Child Welfare Clinic. An earlier report [this *Bulletin*, 1954, v. 51, 1183] showed that, after the first 6 months of life, weight increase was no longer satisfactory. This check to growth was associated with an unsatisfactory diet during weaning. This paper records various signs of malnutrition.

Out of 780 children examined only 10 had a severe discolouration of the hair, which was soft and golden brown all over the scalp. Of the older children nearly 50 per cent. showed less severe changes in the texture and colour of the hair. The change had usually started during weaning. Oedema was present in 15 children. Many of the children who had seemed

happy and cheerful at the breast became dull and apathetic at weaning. A quiet docility and premature maturity were common. Hepatic enlargement was recorded only occasionally. Vitamin deficiencies were rare.

It is thought that the hair changes and the psychological condition were probably attributable to mild kwashiorkor. *R. Passmore*

Wysocki, Alice P., Mann, G. V. & Stare, F. J. **The Cystine and Methionine Content of the Hair of Malnourished Children.** *Amer. J. Clin. Nutrition.* 1954, July–Aug., v. 2, No. 4, 243–5. [11 refs.]

"Chemical analysis of hair samples of 33 Indonesian children with kwashiorkor failed to reveal alterations of the cystine or methionine content."

Oomen, H. A. P. C. Het uitwendig patroon van wanvoeding bij kleuters te Djakarta. [**The External Pattern of Malnutrition in Toddlers at Djakarta (Indonesia)**] *Nederl. Tijdschr. v. Geneesk.* 1954, June 19, v. 98 (ii), No. 25, 1686–96, 3 figs. English summary.

In a clinical examination of 124 children aged up to 6 years living in Djakarta, Indonesia, who were suffering from malnutrition, the signs most commonly found were sub-normal weight, enlargement of the liver, wasting, atrophy of the skin and muscular atrophy, which were noted in 80 to 100 per cent. of instances. A malnutrition index was calculated for each case, based upon the sum of numerical scores assigned to the 10 most frequent manifestations of malnutrition according to severity, the maximum value of the index being 30. The index ranged from 5 to 22, with a mean value of around 12. The maximum incidence of malnutrition was in the 2nd year (58 cases, compared with 7 during the 1st year). Xerophthalmia was present in 66 per cent. of cases, and was seen most frequently in the 3rd year of life. [See also this *Bulletin*, 1954, v. 51, 301, *bis.*] *D. J. Bauer*

Oomen, H. A. P. C. **Xerophthalmia in the Presence of Kwashiorkor.** *Brit. J. Nutrition.* 1954, v. 8, No. 3, 307–18, 1 fig. [19 refs.]

In 44 Indonesian children with evidence of advanced kwashiorkor, 29 had a well-developed xerophthalmia conjunctivae. Of those 14 had in addition evidence of keratomalacia of the cornea with corneal ulcers (6 cases), corneal perforations (6 cases) and panophthalmitis (3 cases). Four of these children died and several left hospital with grossly impaired vision. Liver biopsy was carried out in most cases and showed fatty infiltration and fibrosis in every instance. Respiratory infections and dysentery were common. Two of the deaths were associated with tuberculosis. In some cases it was difficult to decide whether the general condition was essentially dietary in origin or whether the malnutrition was secondary to the infections.

The intake of animal protein and vitamin A was in all cases very low, but some of the children appeared to have satisfactory carotene intakes. In most children, the eye condition improved after daily injections of 75,000 i.u. vitamin A in oil and 100,000 units penicillin in oil (severe cases) or 10 ml. of cod-liver oil three times daily.

The author, however, stresses that the eye condition is due to more than the lack of a single vitamin. "The small uncomfortable child . . ..

threatened with blindness and desperately weakened by a frustrated metabolism " presents a major public health problem. The parents of many were by no means poor and could have afforded better food for their children. Gross parental ignorance appears to be an important factor in the aetiology of these distressing diseases.

[This is essentially a clinical paper and most medical men can learn something practical from it. The author (fortunately perhaps) had no biochemical facilities. That much blindness in children in the tropics is dietary in origin is often forgotten. Here the problem is well set out with all its difficulties.] *R. Passmore*

DE MAEYER, E. M. Traitement diététique du kwashiorkor. [**Dietetic Treatment in Kwashiorkor**] *Ann. Soc. Belge de Méd. Trop.* 1954, Apr. 30, v. 34, No. 2, 139–54, 3 figs. [21 refs.]

This is an important paper which gives practical details of the management of kwashiorkor patients and is based on the author's experience in the Belgian Congo.

In the first phase, when the child may be dangerously ill, skimmed milk, sometimes enriched with casein, is given at increasing concentrations. The volume of fluid given is kept constant at 1 litre per day and the concentration of dried milk powder, containing about 34 per cent. protein, is progressively increased from 7 per cent. on the first day to a final concentration of 13 per cent. on the 4th or 5th day. The protein given is thus gradually increased from about 23 gm. to 45 gm. per day. It is necessary to proceed very slowly at first to avoid fatal accidents owing to digestive intolerances. Sugars, including lactose, frequently give rise to intolerance. In some cases the skimmed milk is in part replaced by casein. The child often has to be fed by gastric intubation.

In the second phase rice and bananas (fresh or in the form of banana meal) are progressively added to the diet. A start can be made with 30 gm. of banana flour and 100 gm. of cooked rice daily, which is gradually increased according to the digestive tolerance.

In the third phase which begins when the digestive enzymes have regained their function and the child is fully convalescent, it is necessary to give a diet rich in both proteins and calories to make good the tissue losses. A high calorie diet containing at least 150 calories per kgm. of body weight per day is needed. Whole milk should replace skimmed milk and palm oil (20 to 30 gm. a day), and meat or fish (100 gm. a day) should be added to increasing quantities of banana flour, rice and maize.

Anthelmintics are all more or less toxic and on no account should be given to infants seriously ill. It is sometimes necessary to feed a child up for 3 or 4 weeks before relieving him of his intestinal parasites. If there is anaemia due to hookworms, a small blood transfusion must be given and worming postponed.

The author compares the vitamin and mineral content of a diet of 130 gm. of skimmed milk powder, 60 gm. of banana flour and 300 gm. of cooked rice with the National Research Council's recommendation for children aged 1 to 3 years. The intake does not come up to the level for any vitamin, except riboflavine, but there is a serious deficiency only in vitamin A activity. The author gives the children a multivitamin preparation (Protovit " Roche ", 1 cc. per day). The diet provides a sufficiency of calcium and phosphorus, but is very low in iron. However, it is not advisable to give iron by mouth at the beginning of treatment as it will

not be absorbed and may interfere with the absorption of protein. It is best to wait 10 or 15 days before giving the indispensable iron supplement.
R. Passmore

Busson, F., Postel, E. & Giraud, P. Valeur alimentaire des poissons pêchés sur les côtes de la Presqu'île du Cap-Vert. [**Nutritional Value of Fish Caught on the Coast of Cape Verde Peninsula**] *Méd. Trop.* Marseilles. 1953, July–Aug., v. 13, No. 4, 534–7. [14 refs.]

This paper records the analyses of 22 specimens of fish belonging to 13 species. Protein content varied from 17·8 to 22·5 gm. per cent. and calorie values from 82 to 115 per 100 gm. No estimations of vitamin content were made.
R. Passmore

Carvalho, J. dos S. Composição de alguns alimentos exóticos e seus nomes vulgares. [**Composition of Some Tropical Foodstuffs and their Common Names**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1555–61. English summary (6 lines).

Gossweiler, J. Plantas espontâneas e cultivadas pelos indígenas para efeitos de alimentação. [**Natural and Cultivated Plants Used as Food by Indigenous People of Angola**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1583–603. English summary (6 lines).

Velho, H. de L. G. A. Composição química de alguns produtos de origem vegetal utilizados na alimentação dos indígenas. [**Chemical Composition of Some Vegetable Products used as Food by Indigenous People of Angola**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1563–82, 2 maps. English summary.

SPRUE

Hjort, P. **On the Glucose Tolerance Test in Sprue.** *Acta Med. Scandinavica.* 1954, June 21, v. 149, No. 2, 119–26, 5 figs. [17 refs.]

The author sets out to discover whether the amount of carbohydrate in the diet was important in determining the shape of the curve in oral and intravenous glucose tolerance tests in sprue. Glucose tolerance tests were performed on 3 patients: (a) after a week on a normal diet consisting of 80 gm. protein, 85 gm. fat and 225 gm. carbohydrate and (b) on a diet comprising 117 gm. protein, 85 gm. fat and 42 gm. carbohydrate. After the low carbohydrate diet the oral curves in 2 patients were higher and broader than those after the normal diet. In one patient the curve was flat on both diets. In a fourth patient who also had diabetes the oral test was done 12 days after insulin was discontinued, on a diet of 60 gm. protein, 60 gm. fat and 120 gm. carbohydrate; it was broad and wide as expected in diabetes.

The intravenous glucose tests (0·5 gm. per kgm. body weight given as a drip) showed normal curves on normal diet and higher and broader curves on the low carbohydrate diet. The results were similar in controls.

The author concludes that in sprue glucose can be absorbed; the abnormality lies in the reduced rate of absorption. There is no evidence of blood sugar imbalance after intravenous glucose.

[The diagnosis of "sprue" in the cases quoted would not be accepted by the reviewer.] *B. G. Maegraith*

Grytting, G. Glutenfri diet ved sprue. [**Gluten-Free Diet in Sprue**] *Nordisk Med.* 1954, Sept. 23, v. 52, No. 39, 1339–40. [11 refs.]

The English summary appended to the paper is as follows:—

"The author reports clinical and biochemical remission by a 75 year old female with sprue treated with gluten-free diet."

HAEMATOLOGY

Wadsworth, G. R. **Haemoglobin Levels of Normal Men and Women living in a Tropical Climate.** *Brit. Med. J.* 1954, Oct. 16, 910–11. [22 refs.]

There is some doubt about the effects of high environmental temperature on man. It has frequently been reported that when men stayed for 2 to 3 days in a hot room there was a fall in the packed cell volume and in the haemoglobin concentration, and it has been suggested that this fall was due to an increase in plasma volume which was found to take place in conditions of environmental warmth. When in the present investigation the haemoglobin level of 337 men and 116 women was measured—all having been living for longer than a few days in Singapore—the mean haemoglobin concentrations found were 16·12 gm. per 100 ml. for men and 13·88 gm. per 100 ml. for women. Normal haemoglobin levels were found in people staying in the tropics for several months or years. The group consisted of Europeans, Chinese, Indians, Malays and Eurasians; there was no evidence of a racial difference in haemoglobin levels.

[For previous studies by the author, see this *Bulletin*, 1953, v. 50, 149, 751.] *H. Lehmann*

de Smet, M. P. Traitement d'attaque des anémies-oedèmes graves par transfusions fractionnées chez des enfants sevrés. [**Treatment of Severe Anaemia with Oedema in Weaned Children by Means of Transfusion**] *Ann. Soc. Belge de Méd. Trop.* 1954, Apr. 30, v. 34, No. 2, 155–69. [23 refs.]

The author gives a good account of the literature and records the results of blood transfusion in 75 African children between 1½ and 6 years of age, suffering from anaemia with or without oedema and caused by malnutrition, haemorrhage (mostly ankylostomiasis) and malaria, or by a combination of these factors. He found the best technique was injection of the external jugular vein with a volume of blood equal to at least one-tenth of the estimated blood volume, for example, a child of 10 kgm. received 50 to 75 ml. blood. The injections were repeated daily until clinical improvement was manifest. The first sign of recovery was reduction of the oedema, associated with diuresis. The erythrocyte count rose slowly. The slowest response occurred in cases in which there was liver damage.

B. G. Maegraith

Diacono, H., Azzopardi, Odile & Diacono, G. Comportement de la résistance globulaire osmotique dans la thalassémie. [**Pattern of Osmotic Red Cell Fragility in Thalassaemia**] *C.R. Soc. Biol.* 1954, May, v. 148, Nos. 9/10, 806–9, 3 figs.

In the conventional red cell fragility test, cells are exposed to decreasing concentrations of NaCl. If the relative amount of haemoglobin liberated by one particular dilution in relation to its neighbours in the series is plotted it will be found that the values for normal blood are lying on a Gaussian distribution curve. In thalassaemia the curve is irregular, because the maximal resistance is increased, yet the " minimal " resistance is normal. Though there are many cells intact at NaCl concentrations at which normal red cells are fully lysed, haemolysis starts at the same concentrations at which normal blood begins to show this phenomenon. *H. Lehmann*

Schapira, G. & Dreyfus, J. C. Groupes N-terminaux de l'hémoglobine de la maladie de Cooley. [**The Terminal Nitrogen of Haemoglobin in Cooley's Disease**] *C.R. Soc. Biol.* 1954, May, v. 148, Nos. 9/10, 895–6.

The globin component of haemoglobin was examined for its valine end-groups and it was confirmed that the values for adult haemoglobin were about 1·7 times as high as those for cord blood containing about 80 per cent. foetal haemoglobin. When globin from subjects suffering from Cooley's anaemia with about 80 per cent. alkali-resistant haemoglobin was investigated it was found to give the same results as that obtained from cord blood. These results are considered to support the assumption that the alkali-resistant haemoglobin of cord blood and that found in Mediterranean anaemia are identical. *H. Lehmann*

van Erp, T. **Detection of Sickle Cells as Anthropological Method.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1954, Sept., v. 6, No. 3, 278–9.

" One hundred successive out-patients and 15 hospital patients—all of Papuan stock—suffering from diseases which frequently occur when sicklaemia is present, were examined by the humid non-stasis method for the detection of sicklaemia. No cases were found. This may be an argument against the theory that the aborigine of New Guinea is of Negroid origin."

Teixeira, W. G. & Teixeira, A. W. G. Um caso de forma activa de anemia de células falciformes numa indígena de Angola. [**A Case of Sickle-Cell Anaemia in a Child in Angola**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 3, 2297–302.

The English summary appended to the paper is as follows:—

" The authors report a case of sickle cell anemia in a native girl of Angola. This is the first one that they know has been reported in that province. The patient belongs to a family composed of father, mother and four children more. The parents and two more of their children presented sickle cells.

" The haematological study of the patient and the remaining six members of this family is presented."

Conn, H. O. **Sickle-Cell Trait and Splenic Infarction associated with High-Altitude Flying.** *New England J. of Med.* 1954, Sept. 9, v. 251, No. 11, 417–20, 2 figs. [17 refs.]

"Two more cases of splenic infarction in Negroes with the sickle-cell trait, precipitated by high-altitude flying, are presented.

"The literature on this syndrome is reviewed, and a well defined symptom complex is recognized.

"The treatment of these cases is considered to be conservative medical management, with splenectomy only upon the development of complications.

"A general program for prevention in the armed forces is proposed."

[See this *Bulletin*, 1950, v. 47, 563.]

Huisman, T. H. J., van der Schaaf, P. C. & van der Sar, A. Enkele onderzoekingen aangaande het abnormale haemoglobine bij sikkelcel-anaemie en sikkelcel-"trait". [**Investigations concerning the Abnormal Haemoglobin in Sicklaemia and Sickle-Cell Trait**] *Nederl. Tijdschr. v. Geneesk.* 1954, Oct. 9, v. 98 (iv), No. 41, 2881–8, 3 figs. [21 refs.]

The English summary appended to the paper is as follows:—

"After a review of the known abnormal haemoglobins present in some anaemias an investigation about the haemoglobin in sicklaemia and sickle-cell trait is described. With the aid of the electrophoretic procedure, the alkali denaturation, ultraviolet spectral determination and estimation of the amino-acid composition it was found that the haemoglobin of sicklaemia is only made up by Hb-b, while in sicklecell trait a mixture of Hb-a and Hb-b is present. The presence of foetal haemoglobin as described in the literature could not be confirmed."

TOXOPLASMOSIS

Weinman, D. Conferencia sobre toxoplasmosis. [Ofrecida el 9 de Julio de 1953 en el Aula de la Cátedra de Bacteriología de la Escuela de Medicina de La Habana.] [**Lecture on Toxoplasmosis**] *Rev. Cubana Lab. Clin.* 1954, Apr.–May–June, v. 8, No. 2, 47–64, 10 figs.

This is a Spanish translation of a lecture delivered in English at the Medical School of Havana, in which the author gives a review of the present state of knowledge of toxoplasmosis based on the literary data and his own investigations. *C. A. Hoare*

Kulasiri, C. **Some Studies on Toxoplasmosis in Ceylon using the Westphal Reaction (a Complement Fixation Test).** *Ceylon J. Med. Sci.* (Sect. D.) 1954, Apr., v. 8, Pt. 4, 223–5.

"1. The endemic toxoplasmosis index for Ceylon obtained employing the Westphal Reaction is 27·5 per cent. This figure was obtained from a survey carried out among people calling for anti-rabies treatment.

"2. Evidence is adduced to show that the Westphal Reaction is not specific."

Scholta, G. Zur Spezifität der Komplementbindungsreaktion nach Westphal auf Toxoplasmose. [**The Specificity of the Complement-Fixation Reaction in Toxoplasmosis**] *Zent. f. Bakt.* I. Abt. Orig. 1954, Mar., v. 160, Nos. 7/8, 655–60. [14 refs.]

The author carried out serological tests by Westphal's complement fixation (CF) and by the dye test (DT) on patients with clinical symptoms of toxoplasmosis, and compared the results with those reported for similar cases by Westphal [this *Bulletin*, 1952, v. 49, 320]. The accompanying table shows that the discrepancy in the results (per cent.) obtained by these observers was so great as to throw doubt on the reliability of the CF test in this disease.

DT	CF	Westphal	Scholta
+	+	67	8
−	−	21	38
+	−	6	32
−	+	6	22

The specificity of the CF test in toxoplasmosis also appeared to be questionable, for in some patients the reaction was positive but the clinical signs were not characteristic of this disease. Since one of these patients was suffering from typhoid, investigations were carried out on the relationship between positive CF reactions for toxoplasmosis and enteric fever. Sera of typhoid and paratyphoid B patients reacting positively to the Gruber-Widal test were subjected to Westphal's CF test with toxoplasmic antigens. It was found that practically all the typhoid-paratyphoid sera gave strong positive CF reactions for toxoplasmosis. As they also reacted positively in CF tests with typhoid antigen, it is concluded that there is no essential difference between the toxoplasmic antigen used in these experiments and the bacterial antigen. Some evidence was also produced of positive toxoplasmin dermal reaction in cases of typhoid and paratyphoid fevers. *C. A. Hoare*

Awad, F. I. & Lainson, R. **A Note on the Serology of Sarcosporidiosis and Toxoplasmosis.** *J. Clin. Path.* 1954, May, v. 7, No. 2, 152–6. [11 refs.]

There is a suspicion that some of the reported cases of human sarcosporidiosis might have actually represented toxoplasmosis. Moreover, it was found by Mühlpfordt [this *Bulletin*, 1952, v. 49, 322] that *Sarcocystis* and *Toxoplasma* could not be differentiated by serological methods, by means of the complement-fixation (CF) and dye (DT) tests.

In the present paper the authors describe the results of an investigation on the antigenic relationships of these two parasites, and their differentiation.

CF tests were made (a) with the sera of various animals (including man) infected with *Toxoplasma* against the homologous antigen, and (b) against *Sarcocystis* antigen; (c) with the sera of sheep, in the majority of which sarcosporidia were detected, against *Sarcocystis* antigen, and (d) against *Toxoplasma* antigen. Finally, the DT was carried out with the sera of sheep, in most of which there was evidence of sarcosporidiosis.

The results were as follows: the DT gave positive results with *Toxoplasma* sera, as well as with some *Sarcocystis* sera; the CF tests with

Toxoplasma antigens reacted positively with toxoplasmic sera but negatively with sarcosporidial sera; and conversely, those in which *Sarcocystis* antigen were used gave positive results with sarcosporidial sera but negative with toxoplasmic sera. It is concluded that, in view of occasional non-specific reactions, the DT is not suitable for the differential diagnosis of sarcosporidiosis, but the results obtained with the CF test failed to demonstrate any antigenic relationship between the causative organisms of these two diseases. *C. A. Hoare*

Frenkel, J. K., Nelson, T. L. & Jacobs, L. **Status of Aureomycin Treatment of Primates with Antibodies to** *Toxoplasma*. *Zent. f. Bakt.* I. Abt. Orig. 1954, v. 161, No. 6, 390–95. [17 refs.]

"Aureomycin therapy did not abolish antibody titers to Toxoplasma in 6 patients and 2 monkeys. Antibody, as measured by the Sabin-Feldman dye test, in five instances remained the same, twice showed a slight increase and once a decrease in titer. Aureomycin is regarded to be without value in the treatment of chronic toxoplasmosis and of very limited value in acute toxoplasmosis."

Holz, J. & Bringmann, G. Elektronenmikroskopische Befunde zur Aureomycin-Therapie der Toxoplasmose. [**Electron Microscope Findings on the Aureomycin Treatment of Toxoplasmosis**] *Ztschr. f. Hyg. u. Infektionskr.* 1954, v. 139, No. 5, 393–8, 6 figs.

The authors first review the findings of other workers on the susceptibility of toxoplasmosis to chemotherapy: a list of drugs, the authors who tested them and the results obtained occupy all but 2 pages. They themselves inoculated mice with *Toxoplasma gondii*, treated them with aureomycin, which prolonged their survival by 14–21 days, and studied the effect on the micro-organism in films of peritoneal exudate. Six photographs (× 16,000) obtained with the electron microscope are reproduced showing various degrees of abnormality, from appearances attributed to alterations in nucleic acid content and arrest of division to actual lysis. Some retained a normal appearance: these were thought to be resistant to the drug and to be those responsible for the eventual death of the animal. *L. P. Garrod*

Bogacz, J. La magnamycine et l'ilotycine. Leur action vis-à-vis des toxoplasmes. [**Effect of Magnamycin [Carbomycin] and Ilotycin on Toxoplasms**] *C.R. Soc. Biol.* 1954, Feb., v. 148, Nos. 3/4, 276–8.

Rabbits, infected with *Toxoplasma gondii* by subcutaneous inoculation of brain emulsion of mice harbouring a human strain of this parasite, were treated with ilotycin (= Lilly's erythromycin) and magnamycin (C. Pfizer) [carbomycin]. When administered subcutaneously for 10 days in doses between 40 and 50 mgm./kgm., these antibiotics brought about an almost complete disappearance of the parasites from all the organs. *C. A. Hoare*

Beverley, J. K. A., Beattie, C. P. & Fry, B. A. **Experimental Toxoplasmosis of the Uveal Tract.** Reprinted from *Brit. J. Ophthalm.* 1954, v. 38, 489–96, 5 figs.

The systemic use of 4:4′-diaminodiphenylsulphone (DDS, dapsone) proved useful in the treatment of experimentally produced *toxoplasma* infection in

the anterior chamber of the eyes of rabbits. It was not completely successful, in that though it caused a regression of the primary iritis a secondary iritis developed after a further 2 or 3 days. It is suggested that the effect of the DDS was to kill the toxoplasms (or most of them) and thus to cut short the primary toxic effects. It did not abolish the antigenic stimulus which after about 7 days resulted in the production of antibodies and a reversed allergy which was responsible for the secondary iritis.

Cortisone given locally, although ineffective by itself, appeared to act by abolishing the secondary allergic iritis, and hence complete, or nearly complete, cures were obtained by the use of a combination of DDS and cortisone. The best results were obtained when the drugs were given within a few hours of infection, but good results were obtained when they were withheld for as long as 53 hours.

"It is suggested that this treatment might be tried in toxoplasmic infection of the eyes in man. It is unlikely that it could be started so soon, but it is also unlikely that so many parasites would be involved in a natural infection." *D. P. Choyce*

DERMATOLOGY AND FUNGUS DISEASES

Trejos, A. *Cladosporium carrionii* **n. sp. and the Problem of Cladosporia isolated from Chromoblastomycosis.** *Rev. Biologia Trop.* San José, Costa Rica. 1954, July, v. 2, No. 1, 75–112, 15 figs. [32 refs.]

In reports by Simson (*Mycologia*, 1946, v. 38, 432) and Powell [this *Bulletin*, 1953, v. 50, 444] on chromoblastomycosis in South Africa and Australia respectively, a type of causative fungus was described which differed from the genus *Fonsecaea* (the common fungi of chromoblastomycosis) in bearing neither phialides nor the *Acrotheca*-like sporiferous apparatus, but presenting only the morphological characters of the genus *Cladosporium* (*Hormodendrum*). In both countries, species of *Fonsecaea* were found in some cases of chromoblastomycosis, but in Australia the pure *Cladosporium* type was the predominant fungus. Campins and Scharyj [*ibid.*, 1954, v. 51, 307] reported 4 cases of chromoblastomycosis in Venezuela, from 30 of which cultures of the causative fungi were obtained. Four of the cultures were identified as *Fonsecaea pedrosoi* and 2 as *F. compactum*; the remaining 24 were not identified at the time but were afterwards found to be of a pure *Cladosporium* type.

The present author has made a comprehensive study of strains of the *Cladosporium* fungus from South African, Australian and Venezuelan chromoblastomycosis, and compared them with other species of *Cladosporium* from pathological sources. He concludes that the *Cladosporium* strains from chromoblastomycosis in the three continents represent a single species, for which he proposes the name *Cladosporium carrionii*, n. sp. A Latin diagnosis of the new species is given, and the taxonomy is as follows: class—*Fungi imperfecti*; order—*Moniliales*; family—*Dematiaceae*.

Of the 46 known isolates of the new species, 25 are from Venezuela, 18 from Australia and 3 from South Africa.

In parasitic life, *Cladosporium carrionii* is indistinguishable from the other fungi of chromoblastomycosis. In culture on glucose agar and other media it forms disk-like colonies which may be umbonate with radial furrows or rugose. The surface is covered by a feltwork of very short aerial hyphae which give it a dark olive-green or brownish-green colour. The mature

colony measures from 14 to 40 mm. in diameter, it is surrounded by a halo of dark, submerged mycelium and its reverse surface is black. Microscopically, the aerial and the decumbent hyphae, septate at irregular intervals, measure from 1 to 3 μ in thickness, generally from 1·5 to 2·5 μ. Hyphal variation, however, is common. Sporulation occurs only in basifugal, branched spore chains; the conidial structures are of the *Cladosporium* type, symmetrical or asymmetrical and more or less branched: disjunctors are always present. The branched sporophores are formed of elongated cells, pigmented like the hyphae from which they arise. The length of the spore chains is variable and chains of as many as 50 elements have been seen. Spore chains sometimes arise directly, without a differentiated basal cell, from the tips or the sides of hyphae. The spores measure, on an average, 4 to 5 μ by 2 to 3 μ, and are therefore much smaller than those of another pathogenic species, *C. trichoides*. Biochemical characters are unimportant and pathogenicity for animals is under investigation. *J. T. Duncan*

Vogel, R. A., Fetter, B. F., Conant, N. F. & Lowe, E. P. **Preliminary Studies on Artificial Active Immunization of Guinea Pigs against Respiratory Challenge with** *Coccidioides immitis*. *Amer. Rev. Tuberculosis*. 1954, Sept., v. 70, No. 3, 498–503. [12 refs.]

An attack of primary coccidioidomycosis, however mild, confers resistance, after recovery, to re-infection, and it is considered that secondary or disseminated coccidioidomycosis is associated with the failure to develop this immunological response. Artificial immunization by vaccination might, therefore, be expected to reduce the incidence of infection, and of dissemination in the infected.

For experimental immunization of guineapigs the authors used, as a vaccine, a suspension of the spherule form of *Coccidioides immitis* developed in yolk sac culture in the chick embryo, and prepared by the method described by Vogel and Conant [this *Bulletin*, 1953, v. 50, 62]. The spherule suspension was sterilized by heating to 60°C. for 30 minutes and diluted in isotonic saline to 1 in 50 for use. Five intramuscular injections of 0·5 ml. of the diluted suspension were given at weekly intervals. At the end of this course it was found that about 88 per cent. of the vaccinated animals had developed dermal sensitivity to coccidioidin.

For the experimental infection, groups of the vaccinated guineapigs and non-vaccinated controls were exposed, in a closed tank of 5,000 litre capacity, to inhalation of the air-borne spores of *C. immitis* for a period of 1 hour. For this purpose, an aerosol was prepared from ground-up and dried culture material containing arthrospores, and the viable content of the material was measured by dilution and plate culture. The aerosol was discharged into the air of the tank and kept in dispersion by a rotating fan.

After exposure to infection, groups of the animals were killed at intervals and examined for gross signs of infection. In recording the degree of disease, 1 to 5 pulmonary nodules of 1 to 2 mm. diameter was returned as a mild infection, 6 to 10 nodules, or less than 5 pneumonic foci, as a moderate infection, and everything in excess of this as a severe infection.

One week after exposure to infection, the specific skin sensitivity of the vaccinated animals to coccidioidin was depressed and some of the non-vaccinated control animals showed early sensitivity. Five out of 6 vaccinated animals killed at this stage showed no gross lesion, but of

the 6 non-vaccinated animals 2 showed moderate and 4 mild infections. Among the animals killed at the end of the second week the difference in morbidity between the vaccinated and non-vaccinated, although not striking, was still evident, and moreover the fungus was more easily found in microscopical preparations from the non-vaccinated than from the vaccinated animals. The most striking differences between the vaccinated and non-vaccinated animals were found in those killed at the end of 6 weeks, when only 3 out of 12 of the vaccinated showed moderate or severe lesions as compared with 11 out of 12 in the group of control animals. Similar proportions to these in the two groups showed extension of the infection to the lymph nodes, and dissemination outside the thorax was found in 2 of the non-vaccinated but in none of the vaccinated animals.

These results indicate that specific vaccination which provokes dermal sensitivity to coccidioidin in the guineapig confers some degree of protection against the disease.

[See also, report on immunization against coccidioidal infection in guinea-pigs, by Negroni *et al.*, this *Bulletin*, 1951, v. 48, 1039.] *J. T. Duncan*

TROPICAL OPHTHALMOLOGY

Oishi, S. Zur Entwicklung und Ätiologie des Trachoms. [**The Causation and Evolution of Trachoma**] *Bull. Yamaguchi Med. School.* 1953, Feb., v. 1, No. 1, 1–11. [11 refs.]

Trachoma has been known to be present for a long time in the north-east provinces of China (Manchuria) and in Japan. It is estimated that just over 60 per cent. suffer from it at some period and that it causes at least a million in these areas to be blind in one eye and 300,000 to be blind in both eyes. The author states that he and his colleagues have been studying the subject for the past 15 years and have come to the conclusion that Prowazek bodies and a virus connected therewith are the cause of some cases, but they are not the sole cause.

The present article is based on the examination of 1,200 schoolchildren in Mukden. Among them were 60 cases of suspected trachoma and 56 of them have been the subject of closer study. The results are presented in a series of tables with remarks thereupon. The author divides them into 2 main groups: inflammatory, 29, and non-inflammatory, 27, and these again into healed, suspected, and aggravated cases. Organisms found among the former group, inflammatory, are shown in another table. The 29 include 5 healed, 3 suspected and 21 definite acute cases. Pneumococci and other cocci were found in 3, 2 and 21 respectively; *B. xerosis* in 5, 3 and 21; Koch-Weeks bacillus in 3 of the acute cases, not in either of the others, and the Morax-Axenfeld bacillus in 3, 2 and 21 respectively.

Among the 27 in the non-inflammatory group, cocci (pneumococci and others) were found in 2 of the 4 healed patients, in 5 of the 6 suspicious and all 17 of the severe cases; *B. xerosis* in 4, 6 and 17 respectively; Koch-Weeks in 0, 1 and 2, and Morax-Axenfeld in 2, 3 and 16 respectively. In yet another table are given the results of examination for Prowazek bodies. They were seen in 8 only of the 56, in 5 out of 18 of those of " average severity " and in 3 out of 18 of those in an early stage. They were not seen in either of the 2 grave cases, the 9 suspected or the 9 healed patients. The numbers are further analysed into the findings at examinations of

475 infants up to 1 year old: 221 in the first 3 months of life, 115 in the second, 76 in the third and 63 in the fourth (9–12 months) period. Among 2,418 patients in 8 places (mostly schools) including 3 separate years in one school at Mukden and 2 separate years in Ube, there were altogether 250 in whom Prowazek bodies were found (10·3 per cent.), the highest being 171 among 1,520 (11·25 per cent.) in the Eye Clinic of the Manchurian Faculty of Medicine.

In his summing up the author maintains that trachoma is not a special disease due to a single cause (Prowazek's bodies), but is the result of inflammation due to a variety of causes setting up progressive or repeated lesions of the conjunctival tissues. *H. Harold Scott*

Kony, Maria. Rapport sur les résultats obtenus par le traitement massif du trachome au Mellah de Casablanca. [**Total Cure of Trachoma in the Mellah Area, Casablanca**] *Rev. Internat. du Trachome.* 1954, v. 31, No. 3, 365–76, 5 figs.

The author's conclusions are translated freely as follows.

1. By daily contact with their Centre and with their medical auxiliaries and social assistants over a period of three months, the indigenous population of the Mellah area, Casablanca, acquired some elementary notions of hygiene for their daily life and applied them in a modest fashion. They also acquired the conviction that trachoma can be treated, that it may be cured, and that blindness can be avoided.

2. In trachoma I the author has already obtained 30 per cent. of cures and 35 per cent. of improvements; in trachoma II she has obtained 6 per cent. of cures and 67 per cent. of improvements. Although modest, these results are nevertheless very encouraging.

3. The statistics show that there is a direct relationship between the number of daily applications of aureomycin ointment and the results obtained. The most encouraging results have been obtained with between 200 and 240 applications. *D. P. Choyce*

Mikuni, M. & Tsuchiya, A. **The Effect of Chloromycetin to Trachoma.** *Acta Med. et Biologica.* Niigata. 1954, Mar., v. 2, No. 1, 461–6, 2 figs.

The present study on trachoma in 77 Japanese schoolchildren was undertaken to decide the effect of mass treatment by the topical use of chloramphenicol ointment. The ointment was used in a 1 per cent. strength and applied by the school nurse once a day with a glass rod after washing the eyes with 1 per cent. saline solution. The earlier the stage of trachoma, the better the results obtained.

Trachoma dubium was cured in 95 per cent. of patients within 6 weeks and all patients within 11 weeks. Trachoma I was cured in 50 per cent. of patients within 7 weeks and 92·3 per cent. within 20 weeks. The cure rate of trachoma II was lower. It increased slowly from 3·8 per cent. within 6 weeks to 50 per cent. within 20 weeks. In trachoma III cure resulted in 2 of 5 patients within 5 weeks and in all within 11 weeks. The cure in all patients, when surgical treatment was combined, was 48 per cent. in 9 weeks and 80·5 per cent. in 20 weeks.

The authors concluded that the continuous application of chloramphenicol ointment with higher concentration than the usual 0·5 per cent., produced

as satisfactory results as aureomycin and oxytetracycline ointments. In addition they found that chloramphenicol is stable and not irritative even in high concentrations. *E. W. O'G. Kirwan*.

See also p. 85, Beverley *et al.*, **Experimental Toxoplasmosis of the Uveal Tract.**

TROPICAL ULCER

Martin, K. **Tropical Ulcer in East Africa.** From a Report to the Standing Advisory Committee for Medical Research in East Africa. 24 pp. [Numerous refs.] [1954.] Nairobi.

Tropical phagedaenic ulcer is still a mystery. It affects enormous numbers of people, causing massive (and unnecessary) suffering and economic loss; it has been known and studied for many years, and yet the aetiology is still a matter of dispute.

In East Africa plans are being made for a comprehensive study of tropical ulcer, and as a preliminary to this combined effort, Dr. Martin has summarized much of the literature in this very informative report, which provides an excellent basis for the investigation. He first shows that ulcer is responsible for a very large part of the work of hospital staffs in East Africa, but for a much smaller proportion in Malaya, Hong Kong and Fiji. He discusses its aetiology and epidemiology, going on to sections on the relation of diet to the condition, its bacteriology and pathology, the part played by trauma, and the question of transmission, which are all aspects of the central problem of causation.

In Africa, of course, tropical ulcer is most common in the Africans themselves, but there seems to be no effective evidence in favour of a racial factor; most cases occur at ages under 30, and more men than women are involved, this distribution, no doubt, being related to opportunity for trauma rather than to anything else.

Climate probably has little direct bearing on the incidence of the disease, but the conditions of life commonly associated with hot climates may be important. For instance, epidemics of ulcer have been related to arduous conditions such as were experienced by the African Carrier Corps of the 1914–18 war, by refugees in Palestine, or by prisoners of war in Burma, Siam and Singapore. Epidemics have been associated with periods of dietary deficiency, and a connexion between diet and ulcer has long been suspected quite apart from epidemics. The section of the report which summarizes the evidence for this connexion is divided into subsections on proteins, fats, vitamins and minerals. The evidence incriminating protein deficiency is impressive, and Martin summarizes it as follows:—

"The sum of evidence offers no doubt that the regular consumption of protein, and particularly animal protein, is effective in the prevention of tropical ulcer. . . .

"In summarising this section, there is a clear connection between protein consumption, and possibly of a protein-fat-vitamin A association, and tropical ulcer. This condition, like other deficiencies, is commoner in climatic periods when these elements are short, and is relieved when, as in the case of vegetables containing vitamin A, they are in good supply."

Bacteriological investigations have often been made, and the presence of fusiform bacilli and spirochaetes has often been reported, but the actual

proof of causation has always been doubtful. On the other hand, the importance of trauma as a portal for infection is universally accepted, and prevention by prompt attention to even minor trauma, as practised by enlightened plantation managers, has been very effective. Similarly, the wearing of protective clothing by troops proved effective during the war. Ulcers have been produced by placing material discharged from an ulcer on the healthy skin of volunteers, or, more easily, by placing the material on scarified healthy skin.

Many methods of treatment have been tried. Topical application of antiseptics (or even cod-liver oil), with rest to the affected part, has always been practised. Strapping, either alone or over some dressing such as Lassar's paste, has been popular in Africa, and thorough occlusion by plaster of paris over ZIPP has given good results. For extensive ulcers skin grafting after scraping or excision is needed, and is successful if the ulcer bed is receptive. The sulphonamides, and more recently penicillin, have greatly improved the results of grafting. Treatment with antibiotics—applied locally or given parenterally or by mouth—has been acclaimed. A table of published results summarizes these various procedures, and it seems that the results of treatment with antibiotics are the most favourable, a notable feature being the early relief of pain and smell. Treatment with antibiotics, like other treatments, is most successful with small ulcers; it is stated that antibiotics are useless in chronic ulcers, and surgical measures are necessary for cure or rehabilitation.

During the preparation of this report, Martin sent a questionnaire to Medical Officers in all parts of East Africa [the reviewer remembers a similar questionnaire in Tanganyika 20 years ago]. The answers from about 70 who sent in complete replies, in general, make the points noted above. Martin recommends trials of various methods of treatment, biochemical and bacteriological investigations, and a study of dietary factors. He concludes as follows:—

" The aetiology of tropical phagedaenic ulcer is complex. There is good reason, however, for believing that food deficiencies, especially of first-class protein, fat and vitamin A, definitely predispose to this condition. The other factors concerned are summarised in the section analysing questionnaire returns. Ulcer is physically preventable by attention to injuries, but the main effort in prevention lies in the provision of food elements that are at present in short supply or are not properly used in East Africa."

Charles Wilcocks

MISCELLANEOUS DISEASES

Williams, Cicely D. **The Vomiting Sickness of Jamaica.** Reprinted from *Med. Women's Federation J.* 1954, Apr., 10 pp. [13 refs.]

This is a brief summary of an official report on the vomiting sickness of Jamaica, and it gives the main conclusions reached and the evidence on which these are founded. These have already been set out by Hill [this *Bulletin*, 1953, v. 50, 562] and in the symposium held in Jamaica [*ibid.*, 1954, v. 51, 113], but the present publication is a lucid and readable account which will be valuable to all interested in the subject.

It seems clear that the diagnosis of vomiting sickness (which should be abandoned) is applied to many different conditions, and that in some of the cases there is severe hypoglycaemia. Work is being continued to discover toxic substances in the ackee fruit and in the constituents of the

" bush teas " which are a feature of Jamaican life. Malnutrition is common, and the suggestion is made that the hypoglycaemia may be associated with fatty change in the liver, and may be the result of the ingestion of a large carbohydrate meal (often consisting of enormous amounts of sugar cane) by a child who has been short of other kinds of food, with consequent overproduction of insulin. It has been shown elsewhere that persons with fatty liver are hypersensitive to insulin. [The argument for this aetiological process is not given in full, and it is advanced only as a possibility. Further work is obviously needed.] Family outbreaks are probably the result of ingestion of some toxin. A suggestion is made that the arillus of the ackee is an excellent culture medium for the staphylococcus, and that some cases may be due to staphylococcus toxin from this source.

Charles Wilcocks

Fournier, J., de Lajudie, P. & Chambon, L. Recherches sur les procédés de laboratoire applicables au diagnostic de la mélioïdose. [**Researches on Laboratory Procedures for the Diagnosis of Melioidosis**] *Méd. Trop.* Marseilles. 1953, Sept.–Oct., v. 13, No. 5, 683–97. [31 refs.]

The authors' experience is based on 31 cases of melioidosis from which 54 strains of *Pf. whitmori* were isolated. Cultures from the blood were made in ordinary broth, and from abscesses in broth and on agar. The organism regularly produced a surface pellicle in broth and an odour resembling truffles. Its identity was confirmed by cultural, biochemical and serological means, and finally by inoculation into guineapigs. Isolation by guineapig inoculation was attempted by injecting the patient's blood intraperitoneally, or pus subcutaneously or, if contamination with other bacteria was suspected, by application to the shaven skin of the animal. There might be some difficulty in distinguishing Whitmore's bacillus from achromogenic forms of *Ps. pyocyanea.*

Three serological procedures for diagnosis were examined—the agglutination, haemagglutination and complement-fixation tests. For the agglutination test, formolized suspensions of a smooth strain were used, and readings were made after 4 hours' incubation at 37°C. and 18 hours on the bench. Agglutination was of the granular O type. The test was not very sensitive and was negative in several proved cases throughout the illness. Tests with sera from other febrile and afebrile patients gave 4 per cent. of false positives. These were specially frequent in persons with *Salmonella* infection, due to cross-relation with *Salmonella* O antigens. Only titres of 1 in 80 or over are to be regarded as significant.

The haemagglutination test is done with horse or human (Group O, Rh-negative) erythrocytes treated with a trichloracetic acid (Boivin) extract of Whitmore's bacillus. Readings are made after 1 hour's incubation at 37°C. followed by half an hour on the bench. This test was more specific and sensitive, but 2 patients with localized lesions, out of 7 tested, gave negative results. There were 3·13 per cent. of false positives, mostly in the group of *Salmonella* cases. A titre of 1 in 4 or over is considered significant.

For the complement-fixation test, the Boivin extract was used as antigen. This test, with 5·2 per cent. of false positives, was the least specific of the three.

It is recommended that all three tests should be done, since it appears that any one serum is unlikely to give a false positive with all the tests. Sera should be tested also for *Salmonella* agglutinins.

A skin test in which the Boivin extract was injected intradermally was without value in diagnosis, since an immediate reaction was obtained both in normal subjects and in patients with melioidosis. *J. C. Cruickshank*

Woodruff, A. W. **Advances in the Treatment of Tropical Diseases.** *Practitioner.* 1954, Oct., v. 173, No. 1036, 441–8. [21 refs.]

In this review of recent advances, Professor Woodruff discusses the newer antimalarial drugs, the present position in the treatment of amoebiasis, the treatment and prevention of trypanosomiasis and gives brief notes on the treatment of leishmaniasis and plague.

There is a short reference to epidemic haemorrhagic fever, and notes on the present treatment of tapeworm, threadworm and filarial infections.

This summary will prove useful to those who have not regular access to the literature on tropical medicine. *H. J. O'D. Burke-Gaffney*

PARASITOLOGY: GENERAL

Ruiz, A. & Lizano, Cecilia. Parásitos intestinales en niños. Estudio comparativo de los métodos diagnósticos usados. [**Intestinal Parasites in Children. Comparative Study of Diagnostic Methods**] *Rev. Biologia Trop.* San José, Costa Rica. 1954, July, v. 2, No. 1, 29–36. English summary.

With the idea of finding out the incidence of intestinal parasites in Costa Rican children the authors examined the faeces of 200 children 3 to 13 years of age, from different parts of the country, but mainly from the province of San José. Three methods of examination were used: (1) direct examination of a fresh preparation in physiological saline, in Lugol's solution or in 1 per cent. eosin; (2) direct examination of a preparation in Lugol's solution after concentration by Faust's method; (3) examination of 4 preparations fixed in Schaudinn's fluid and stained by Mallory's haematoxylin to differentiate cysts and trophozoites of flagellates. The fixation was for 3 hours; then the preparation was placed in 70 per cent. alcohol for 24 hours and stained for 18 hours. In 2 only of the 200 were no parasites found.

To detail the results would occupy too much space; readers should refer to a table where these are given.

We may sum up the findings by saying that the commonest helminths were *Trichuris trichiura, Ascaris lumbricoides* and ankylostomes in 86·5, 62 and 48 per cent. respectively in fresh preparations and 90, 65·5 and 51·5 by all methods; *Enterobius vermicularis* was not seen at all in fresh preparations "a further proof that this is not an appropriate method for finding the ova of this nematode" [abstracter's translation]. *Hymenolepis nana* was found in 6 per cent. of fresh preparation and 7 per cent. by concentration, but *H. diminuta* is uncommon in Costa Rica [in fact it was not found in any of these 200]. Other tables give the percentages of protozoa, 71 per cent. altogether, and the number of protozoal parasites; thus 1 only was seen in 31 per cent., 2 in 22, 3 in 12, 4 in 4·5, 5 in 2·0, 6 in 1 per cent. and 7 in a single instance (0·5 per cent.); and of helminths in 97 per cent. altogether and the relative perceutages as follows: 1 in 18,

2 in 40, 3 in 28, 4 in 10·5 and 5 in 1 per cent. *E. histolytica* was found by the use of all 3 methods in 16 per cent., *E. coli* in 51 per cent., *Chilomastix mesnili* 20·5, *Giardia* 18·5, *Trichomonas hominis* 17·5, *Enteromonas hominis* 9, *Endolimax nana* 9, *Iodamoeba bütschlii* 5, *Balantidium coli* 2. These figures are in percentages.

In their summary the authors state that in the case of worms direct examination yielded results only slightly smaller than did concentration methods and as for *Trichuris trichiura* " the proportion was greater in direct examination than in concentration ", but for protozoa Faust's method gave considerably higher positives than did direct examination.

They conclude: " It is worth stressing that, although concentration by Faust's method is helpful in the search for cysts of *Endamoeba histolytica*, it is often impossible to identify as such small forms whose internal structure cannot be clearly made out even when stained with Lugol's solution. It becomes necessary then, in order to arrive at the correct diagnosis, to stain with hematoxylin. By this means it was possible to raise to 14% the incidence of this parasite, which had been found in 2·5% of fresh samples and in 7% of concentrated samples." [How far the examination of so small a number of Costa Rican children can be regarded as indicating the incidence in the country as a whole is a matter of opinion.]

H. Harold Scott

Herzberg, K., Herzberg-Kremmer, H. & May, G. Weitere Untersuchungen über *Pneumocystis carinii* bei Säuglingspneumonien. 3. Mitteilung. [**Further Investigations on *Pneumocystis carinii* in Pneumonia of Infants. 3rd Communication**] *Zent. f. Bakt. I. Abt. Orig.* 1954, Mar., v. 160, Nos. 7/8, 661–70, 5 figs. [10 refs.]

In a brief introductory review, the authors state that infection with *Pneumocystis carinii* in cases of interstitial pneumonia of infants, especially in those born prematurely, has now been recorded in different parts of Germany.

In the present paper they describe the appearance of the parasite and attempts to transmit it experimentally to laboratory animals. The material for the morphological study consisted mainly of " dab " smears of infected lung tissue, which were first dried in the air and then stained by one of the following methods: Heidenhain's and Weigert's iron haematoxylin, Mayer's acid haemalum, Gram's and Giemsa's methods. Satisfactory results were obtained only with Giemsa's method [described previously: this *Bulletin*, 1953, v. 50, 456] and with Weigert's method. Preparations thus stained revealed in the foamy contents of the alveoli and bronchioli numerous 8-nucleate cysts of the parasite. Their excystation was not observed, but within the cysts the " *Teilparasiten* " may be rounded or sickle-shaped [the unusual term " *Teilparasiten* " presumably denotes 8 daughter-individuals produced by fission of the cytoplasm around the cystic nuclei]. From the description of the parasites and from the microphotographs illustrating them, it would seem that finer cytological details of their structure were not seen. [Since the smears were dried before staining with haematoxylin, the failure to obtain satisfactory results is not surprising.]

Attempts to infect mice and chick embryos with teased-up infected lung tissue produced negative results. *C. A. Hoare*

ENTOMOLOGY AND INSECTICIDES : GENERAL ZOOLOGY

FULLER, H. S. **Experimental Epidemiology in relation to Arthropod-Borne Disease.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 420–29. [42 refs.]

Epidemics of arthropod-borne diseases are the result of the interaction of a variety of factors such as efficiency of the vector, relationship between pathogen and vector, and population dynamics of the vector and the host. While field observations may suggest a qualitative and a quantitative relationship between pathogen, vector and host, experimental epidemiology or a study of their interrelationships under controlled laboratory conditions is necessary to place the field observations on a sound and adequate quantitative basis.

One of the applications of experimental epidemiology is the determination of vector efficiency. This is " an experimentally determined numerical value which represents the average number of transmissions effected by a given individual of a particular species of vector under precisely defined and controlled conditions ". Since experimental transmissions are almost always done on laboratory animals, the application of this factor to human epidemics has some limitations.

In instances where transmission takes place only at the time of feeding and where the vector takes multiple feeds, it is theoretically possible to determine vector efficiency by experimental methods. However, where the vector feeds only once in a given stage, or methods of transmission other than feeding occur, or where transmission is not by feeding at all, it is either impossible to determine vector efficiency or it has to be determined from other factors. Other limiting factors for the experimental determination of vector efficiency are the absence of suitable methods for rearing and maintaining the vector or instances where man is the only known suitable host for the pathogen.

Vector efficiency may be influenced by several natural phenomena like longevity of the vector, frequency of contact with man and other hosts, number and frequency of feedings, presence or absence of multiplication of the pathogen inside the vector, mode of egress from the vector, viability outside the vector and any possible harmful effects upon the vector.

Arthropod-pathogen-host systems could be studied in the laboratory by initiating an epidemic in a susceptible host population and following its course. It is needless to say that individual studies of vector, pathogen and host are necessary before they can be put together as a system. The changes which an introduced cause brings about in this system can then be analysed and studied.

The author points out that in the design of such systems certain features like ease of maintenance of the pathogen, simple methods of detecting and counting them, control of their dosage and the risk of infection among personnel should be considered. When choosing the animal host it should be one in which the pathogen thrives and on which the vector feeds without the host eating the vector. The author gives 6 vector-pathogen-host systems in which vector efficiency may be determined by experimental methods. These are fleas and plague, fleas and murine typhus, Ixodid ticks and Rocky Mountain spotted fever, *Ornithodorus* ticks and relapsing fever, Reduviid bugs and trypanosomiasis, and Trombiculid mites and scrub typhus.

As the author points out, experimental epidemiology not only serves to compare the efficiency of 2 different species as vectors and assess the

effect of various factors upon a particular species, but it also serves to test experimentally observations of a disease in its natural state. In addition, it is a useful method for testing various hypotheses and theories.
M. G. R. Varma

LAIRD, M. **The Mosquitos of Aitutaki, Southern Cook Islands.** *Bull. Entom. Res.* 1954, Sept., v. 45, Pt. 3, 423–7, 2 figs. on pl. [12 refs.]

The author continues his welcome series of papers [this *Bulletin*, 1954, v. 51, 1215 and 1221] on the mosquitoes of the smaller and less visited islands of the Pacific. The island of Aitutaki in the Cook group lies far to the east of the limits of *Anopheles* and most other genera of mosquitoes found in lands further west. In it Laird has only found *Aëdes polynesiensis*, *Culex fatigans* and *C. annulirostris*. He discusses the question as to how these insects reached this remote spot. *P. A. Buxton*

MATTINGLY, P. F. **Notes on the Subgenus *Stegomyia* (Diptera, Culicidae) with a Description of a New Species.** *Ann. Trop. Med. & Parasit.* 1954, Sept., v. 48, No. 3, 259–70, 3 figs. [31 refs.]

Descriptions are given of the following mosquitoes of the genus *Aëdes*, all of which are members of the subgenus *Stegomyia*: a unique (unnamed) male of the *scutellaris* group from the Maldive Islands; a unique (unnamed) female of the *africanus* group from the Gambia; the male, female, pupa and larva of a new species, *patriciae*, from the western Himalayas; the male, female and larva of *cretinus* and the male terminalia of *granti*.

Some points of classification are discussed and some additional African distribution records are given. *H. S. Leeson*

MICKS, D. W. **Paper Chromatography as a Tool for Mosquito Taxonomy: the *Culex pipiens* Complex.** *Nature.* 1954, July 31, v. 174, 217–18, 2 figs.

This paper describes an interesting application of one- and two-dimensional paper chromatography to the study of mosquito extracts [this *Bulletin*, 1952, v. 49, 451, 807] as a means of distinguishing between members of the *Culex pipiens* complex where taxonomic and biological differences appear to be insufficient for accurate identification of the species grouped under the complex.

In order to demonstrate consistent biochemical differences between members of the complex, the author used specimens from laboratory colonies of *Culex pipiens* and *C. fatigans* (both from America) and *C. molestus* (from Germany). European *C. pipiens* were collected as adults from Italy. The adults of all species, except the last-named, were used at 2 to 3 days of age, unfed. For some experiments, extracts were prepared after the mosquitoes had been homogenized and the protein precipitated with methanol. The clear solution after centrifugation was applied to the paper. In other cases, whole bodies were used after protein had been coagulated by boiling the mosquitoes in water. The bodies were mashed on to the paper with a glass rod. Four adult female mosquitoes were always used to make one preparation.

Chromatograms of 4 extracts of each member of the *Culex pipiens* complex, as well as those of whole boiled mosquitoes, revealed consistent differences in their ninhydrin patterns. No attempt was made to identify

the substances in the one-dimensional chromatograms, as the general picture seemed adequate for identification within the *C. pipiens* complex. These chromatograms showed different patterns for the 4 species under examination. That of *C. pipiens* (European) was quite different from those of the other 3, of which the *C. pipiens* (American) chromatogram showed more marked differences from that of *C. fatigans* and *C. molestus*, whose patterns were similar.

The overall patterns of the two-dimensional chromatograms, however, indicated a distinct similarity between *C. pipiens* (European) and *C. fatigans*, and between *C. pipiens* (American) and *C. molestus*.

In general, the two chromatographic methods suggest different groupings within the complex. For example, in one-dimensional chromatography, *C. pipiens* (European) has a pattern quite distinct from the remainder, but in two-dimensional separations, its pattern is very similar to that of *C. fatigans*, from which it is separated by a greater density of colour of certain ninhydrin-positive spots.

The two-dimensional method may be the more reliable because of the better separation it offers, and because the ultimate criterion of the method is based on the concentration of certain amino acids as judged by the density of colour given by the ninhydrin reaction.

[A difficulty may arise in the suggested use of 4 specimens for each analysis. Unless an accurate preliminary identification is made, one may find, for example, that a specimen of one species may be mixed with that of another, and so give a misleading chromatographic pattern.

This method of identification is a promising indication of how the versatile analytical procedure of chromatography may be applied to the solution of taxonomic problems, and since paper chromatography is essentially a micro-method, the accuracy of the identification of species may be greatly enhanced if single specimens of mosquitoes could be used instead of the 4 as suggested in the paper.] *J. S. Harington*

Micks, D. W. & Scrollini, F. **An Infrared Spectrometric Study of the *Culex pipiens* Complex.** *Riv. di Parassit.* Rome. 1954, July, v. 15, No. 3, 161–5, 3 figs.

The authors have applied the method of infrared spectrophotometry to distinguish between the species comprising the *Culex pipiens* complex. Laboratory colonies of *Culex pipiens* (America), *C. fatigans* (America), *C. molestus* (Germany) and *C. pipiens* (Europe) provided the material for the study.

Unfed adult female mosquitoes of ages 24–48 hours were homogenized in carbon disulphide and the preparation was centrifuged. After treatment, the clear supernatant was analysed with a spectrometer, and characteristic infra-red absorption spectra were obtained for each species. These were reproducible with different extracts of the same species. Quantitative differences between the species were especially noticeable in a broad band between 13·8 and 14·5 μ.

It was found that the spectra of the two strains of *C. pipiens* were essentially the same, and that the curves coincided almost exactly. Those of *C. fatigans* and *C. molestus* showed consistent and characteristic differences although the same major absorption bands were observed in all preparations of the 4 species.

The authors point out the agreement between the taxonomic identity and the identical infra-red spectra of the European and American species of *C. pipiens*. *J. S. Harington*

Dobrotworsky, N. V.; Drummond, F. H. **The *Culex pipiens* Group in South-Eastern Australia. I.** [Dobrotworsky]. *Proc. Linnean Soc. of New South Wales.* 1952, v. 77, Pts. 5/6, 357–60, 3 figs. **II.** [Dobrotworsky & Drummond]. *Ibid.*, 1953, v. 78, Pts. 3/4, 131–46, 5 figs. [28 refs.]

The outbreak of Murray Valley encephalitis in 1950 [*Bull. Hyg.*, 1952, v. 27, 718], besides the interest in mosquitoes in connexion with the control of myxomatosis in rabbits, has encouraged a fuller study of the *Culex pipiens* group of mosquitoes in south-east Australia. The first of the two papers describes all stages of *C. globocoxitus* n. sp. This is a member of the group, although both male and female are readily recognizable from others of the group in Australia. It is anautogenous, stenogamous and homodynamic. Although sometimes found in bedrooms it does not bite man. Larvae occur in swamps, large and small pools in creek beds, in drainage pits and, in winter, in small grassy pools. *C. globocoxitus* is found throughout Victoria and in neighbouring parts of South Australia and New South Wales, and in Tasmania.

The second paper gives an account of the morphology, biological features, and distribution of *C. fatigans*, *C. pipiens* form *molestus* and of *C. pipiens australicus*, n. subsp. The last has previously been reported as "*fatigans* type B" and the larva as "long-siphoned *fatigans*".

C. pipiens australicus is widely distributed in Australia. It has biological characteristics similar to those of *C. pipiens* being anautogenous, eurygamous and heterodynamic. It is a rural or semi-rural mosquito which does not bite man, larvae occurring in artificial containers and, sometimes, in polluted water although typically in pools, swamps or channels of clean water.

C. fatigans is also widely distributed in Australia but in southern Victoria is found regularly only in late summer and autumn. It is the common domestic *Culex* over much of the continent; it breeds in all kinds of artificial water containers. It is thought that this species was introduced to Australia by the early white settlers.

C. pipiens form *molestus* was first recorded from Australia in 1951 and is believed to have entered the country about 10 years ago. It has the characteristics of *C. molestus* of Britain except that it is common in rural areas near buildings in Australia. It is a biting pest of man in its limited distribution in Victoria and Tasmania.

Although all three members of the group interbred in the laboratory, this does not occur or is not commonly observed in nature. *C. globocoxitus* did not cross-breed in the laboratory with *australicus*, but was fully fertile with the other two members of the group. There is some evidence of cross-breeding of *globocoxitus* and *molestus* in the suburbs of Melbourne.

D. S. Bertram

Lee, D. J. & Reye, E. J. **Australasian Ceratopogonidae (Diptera, Nematocera). Part VI. Australian Species of** *Culicoides*. *Proc. Linnean Soc. of New South Wales.* 1952, v. 77, Pts. 5/6, 369–94, 93 text figs. & 22 figs. on pl.

"This systematic review of the Australian *Culicoides* comprises a discussion of the six species previously recorded from the region together with descriptions of fifteen new species, all from eastern Australia. Separation of species is primarily based on wing patterns but such other useful details as are revealed in head structures, thoracic patterns, tarsi and spermathecae

are illustrated for the majority of species. A key to the identification of species is presented and a brief summary of such details of the biology of the various species as are known."

Raynal, J. H. Les phlébotomes de France et leur distribution régionale. [**The *Phlebotomus* Species of France and their Regional Distribution**] *Ann. Parasit. Humaine et Comparée.* 1954, v. 29, No. 3, 297–323. [126 refs.]

A short history is first given of the discovery of the medical importance of *Phlebotomus* and then of the vicissitudes of the system of classification of these sandflies.

Six species are known to occur in France: *Phlebotomus perniciosus, P. mascittii, P. ariasi, P. minutus, P. papatasi* and *P. sergenti.* The first two are the most widely distributed. The four last-named species are found only in the south, *P. ariasi* in the south-west and west and the others only in the south-east on the Mediterranean coast. All except *P. minutus* are able to feed on the blood of man.

The male and female of each species are described and details of the locality records are given for France. *H. S. Leeson*

Toumanoff, C. & Chassignet, R. Contribution à l'étude des phlébotomes en Corse. [**Study of *Phlebotomus* in Corsica**] *Bull. Inst. Nat. Hyg.* Paris. 1954, July–Sept., v. 9, No. 3, 664–87, 8 figs. on 3 pls. [40 refs.]

The authors present a detailed taxonomic study of the 4 species of *Phlebotomus* found in Corsica; *P. perniciosus, P. papatasi, P. mascittii* and *P. minutus.* The descriptions are accompanied by microphotographs of the male genitalia and the female spermathecae. The first-named species has been recorded by numerous authors but the other 3 are here recorded for the first time from Corsica.

Some notes are given on the history of the investigation and on breeding places. It was observed that sandflies were absent from all places which had been treated with DDT in the course of the campaign against *Anopheles* mosquitoes. *H. S. Leeson*

Fairchild, G. B. & Hertig, M. **Notes on the *Phlebotomus* of Panama. IX. Descriptions of Seven New Species.** *Ann. Entom. Soc. of America.* 1952, Dec., v. 45, No. 4, 505–28, 74 figs. on 7 pls.

Wolfenbarger, K. A. **Systematic and Biological Studies on North American Chiggers of the Genus *Trombicula*, Subgenus *Eutrombicula* (Acarina, Trombiculidae).** *Ann. Entom. Soc. of America.* 1952, Dec., v. 45, No. 4, 645–77, 8 pls. [13 refs.]

Dias, J. A. T. S. Subsídios para o estudo da ixodofauna da Ilha da Madeira. [**Observations on the Ticks of Madeira**] *Anais Inst. Med. Trop.* Lisbon. 1953, June, v. 10, No. 2, 261–80, 6 figs. [11 refs.] English summary.

Dias, J. A. T. S. Nova contribuição para o estudo da teratologia dos ixodídeos. [**Observations on the Teratology of Ticks**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 3, 2249–75, 40 figs. [20 refs.] English summary.

Théodoridès, J. Notes sur des Coléoptères d'importance médicale (deuxième série). [**Notes on Coleoptera of Medical Importance. Second Series**] *Méd. Trop.* Marseilles. 1954, May–June, v. 14, No. 3, 318–23. [25 refs.]

The author comments on some recent literature in which certain beetles belonging to 11 families are reported to be of medical interest [see also this *Bulletin*, 1952, v. 49, 731]. Perhaps the most outstanding of these accounts are the following:—a substance given the name *pédérine* has been isolated from one of the blister beetles *Paederus fuscipes*; experiments are reported which claim to show that extracts of *Tribolium castaneum* and of the larvae of *Chrysomela populi* are active against certain bacteria; references are also made to work on the experimental infection with rickettsiae of the larvae of *Tenebrio molitor* [this *Bulletin*, 1952, v. 49, (943)]. *H. S. Leeson*

Oldroyd, H., **The Horse-Flies (Diptera: Tabanidae) of the Ethiopian Region. Vol. II.** *Tabanus* **and Related Genera.**

This book is reviewed on p. 110.

ERRATUM

In the abstract of the paper by Reid on house-flies and blow flies in Malaya [this *Bulletin*, 1954, v. 51, 652], the words " brown dust " in the fourth line should read " prawn dust ".

Quarterman, K. D., Mathis, W. & Kilpatrick, J. W. **Urban Fly Dispersal in the Area of Savannah, Georgia.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 405–12.

The present studies were made in Savannah, Georgia, on fly-dispersal habits in urban areas. Test flies were obtained by trapping wild adults in the spots selected as release points. A combination of radio-active chemicals, given to them with milk, plus a variety of dyes dusted on them before release, were used as marking agents. The flies included *Musca domestica*, *Callitroga macellaria*, *Lucilia*, spp., *Sarcophaga* spp. and a few other species.

Experimental data, presented in 7 tables, showed the following results.

(1) Fly dispersal was rapid, continuous and in all directions, flies concentrating in greater numbers in areas most attractive to them. House-flies were recovered primarily in residential areas and such " hot spots " as horse stables and pig pens. All others were relatively distributed in all areas, and large numbers of *Callitroga macellaria* and some of all species were recovered in vacant areas considerably removed from major fly-breeding sources, indicating their relatively stronger migratory habits.

(2) The majority of the marked house-flies and *Lucilia* spp. recovered were trapped within half a mile of release points, although approximately one-third of the recaptured flies were trapped more than a mile away in one test. The majority of *Callitroga macellaria* recovered were trapped between 1 and 4 miles from release points, yet some were recovered as far as 7·2 miles away—against 7·6 for *Musca domestica*, 5 for *L. pallescens*, 3·5 for *L. sericata* and *Fannia pusio* and 2·1 for *Sarcophaga sueta*. In general, the authors think that if the average number of marked flies recovered per trap in each zone was multiplied by a correction factor to equalize all traps on the basis of land area served, the figures would indicate that large

numbers of flies moved into the areas beyond the 1-mile zone up to 4 miles or more from the release points.

(3) There is a high positive correlation between heavy fly-producing sources near a city and the density of the fly population in the city itself, so that it was evident that municipal fly control should be approached on a city-wide basis with special consideration to the outlying foci of high production which may contribute substantial numbers of flies to the city proper.

G. R. Shidrawi

Quarterman, K. D., Kilpatrick, J. W. & Mathis, W. **Fly Dispersal in a Rural Area near Savannah, Georgia.** *J. Econom. Entom.* 1954, June, v. 47, No. 3, 413–19, 1 fig.

Having obtained some information on fly dispersal habits in urban areas in a previous study [see above], the authors at present have done similar studies in rural areas in a part of Effingham county near Savannah, Georgia. As in the previous studies, test flies were obtained by trapping adult flies on the rural premises that were used as the release points. Radio-active phosphorus (P-32) was used as the marking agent, being given to them with milk 24–48 hours before their release. To minimize the effects of caging, release was made at dusk after it had become too dark for them to migrate. Dyes were used in combination with phosphorus to mark the test flies at various release points. Daily dispersal maps were prepared and the direction of fly movement was compared with the prevailing wind directions.

Four tables of results and one figure showed that dispersal was at random over an area 8–10 miles in diameter with few individuals being trapped up to 10 miles from the release point. House-flies were recovered up to 5 miles from the release points in less than 24 hours after release, and the farthest distances at which marked flies were recovered were approximately $7\frac{3}{4}$ miles for *Musca domestica* in a west-south-westerly direction and approximately 10 miles for *Callitroga macellaria* in a north-easterly direction. In one of the two tests there was no detectable effect of wind direction on the movement of the flies. Within their dispersal areas, flies tended to congregate more at premises where food and breeding material were more favourable. Nevertheless the fact that flies were found in all areas indicate that their movement is a normal pattern of fly activity. The range and pattern of flight of the house-flies in these tests were quite similar to those of *Callitroga macellaria*. However, a higher rate of recoveries of the latter in the recovery traps makes one believe that they are more migratory in their habits.

G. R. Shidrawi

i. Norton, R. J. **Inheritance of DDT Tolerance in the House Fly.** *Contr. Boyce Thompson Inst.* 1953, Jan.–Mar., v. 17, No. 2, 105–26, 1 fig. [23 refs.]

ii. Johnston, E. F., Bogart, R. & Lindquist, A. W. **The Resistance to DDT by Houseflies. Some Genetic and Environmental Factors.** *J. Heredity.* 1954, July–Aug., v. 45, No. 4, 177–82. [10 refs.]

Both these papers deal with crossing experiments between normal house-flies and DDT-resistant strains; 4 different resistant strains are involved in the first paper and 2 in the second, one strain being common to the two. In the first paper, the degree of resistance was estimated by exposure to a thermally generated aerosol of DDT and in the second by droplet application of acetone solutions of DDT to individual flies. In both cases the levels

of resistance of various progeny are indicated merely by the mortality caused by a single concentration so that no idea can be gained of the type of variation (or possible segregation) of resistance occurring. However, the following observations were made from the data.

i. The progeny of reciprocal crosses were intermediate in resistance and continued thus for 10 generations of inbreeding. In all cases, however, the progeny derived from a resistant [? male] × normal [? female] was more susceptible than the inverse cross. Back crosses to the parental strains from the progeny of these two types of primary cross, were about equally resistant. Repeated back-crossing to resistant strains, or to normal flies, respectively raised and lowered the levels of tolerance.

ii. The progeny of both reciprocal crosses were intermediate in resistance in F_1 and F_2 generations. In F_1 there was no difference in resistance related to the original cross, but in F_2 there was greater resistance if the resistant parent of the original cross was female rather than male. This relation was also shown in all types of back cross from F_1; those derived from an original resistant female being more tolerant than the corresponding series derived from a resistant male in the original cross.

No conclusions, expressed in orthodox genetical terms, are given in the first paper. In the second it is stated that "the fact that resistance is greater when transmitted through the female and the fact that there is no segregation in F_2 according to any recognizable genetic pattern . . . [? evidence] . . . both point to the conclusion that the resistance factor is carried in the cytoplasm".

After 8 months' inbreeding in the absence of DDT, 3 of the 4 resistant strains used in the first study showed a decline in tolerance. The other strain maintained its high resistance for a further 6 months. Of the two resistant strains in the second study both declined in tolerance, in 6–9 generations.

In the first paper it was observed that the larval stage of 3 resistant strains was longer than normal, while the fourth was slightly shorter.

J. R. Busvine

Rajindar Pal, Sharma, M. I. D. & Krishnamurthy, B. S. **The Relationship between the Lipoid Solubility of D.D.T. and its Contact Toxicity to Houseflies and Mosquitoes.** *Indian J. Malariology.* 1954, Mar., v. 8, No. 1, 29–31, 22 figs. on 4 pls.

Pradhan *et al.* (*Nature*, 1952, v. 170, 619) investigated the solubility of DDT in epicuticular waxes extracted from the larval exuviae of two species of insect and found a correlation between solubility and sensitivity of the insect to DDT. In the present paper the authors have considered this as a possible explanation of the different susceptibilities of the following insects: *Anopheles stephensi*, *Musca domestica* var. *nebulo* and *Culex fatigans*. (These are placed in order of increasing resistance, as indicated by the time before knock-down, when they were exposed to 50 mgm. DDT per sq. ft. on a glass plate.)

Extracts of cuticular lipoids were made by soaking large numbers of insects in chloroform at room temperature for 24 hours. The liquid was filtered and evaporated and a 1 per cent. solution in chloroform was prepared from the residue. One ml. of this was allowed to evaporate on a microscope cavity slide. The waxes from the different insects were different in appearance. When fine DDT crystals were scattered over the wax films, their progressive solution could be observed in the *Anopheles* and *Musca* wax, but very little dissolved in the wax from *Culex fatigans*. This seems consistent with the hypothesis.

J. R. Busvine

Beran, F. Ein Beitrag zur Methodik der Insektizidprüfungen. [**A Contribution to the Method of testing Insecticides**] *Pflanzenschutzberichte.* Vienna. 1953, v. 11, Pts. 9/12, 151–60, 2 figs. English summary. [Summary taken from *Rev. Applied Entom.* Ser. B. 1954, Aug., v. 42, Pt. 8, 123–4.]

Musca domestica L. is frequently used as a test insect for the evaluation of contact insecticides, but comparison of the results obtained by different workers is difficult because of the diverse methods adopted. The two principal methods are exposure to a deposit, for a given period or until a given effect is produced, and topical application. A technique is described for the latter in which graduated series of concentrations are used and the flies are treated with 1-mml. droplets and then kept in perforated cellophane bags containing cotton-wool soaked in sugar solution. The bags are used once only, so that cleaning of containers is eliminated. The deposit method is the more usual and has sometimes been used for quantitative determinations, but these are valid only if an equal amount of toxicant is taken up by each insect. This was shown not to be the case in experiments in which batches of 25 female flies were placed in petri dishes containing deposits from a solution of 10 per cent. DDT in ether and others received for comparison topical applications of 0·4 mg. DDT in acetone. Mortality was complete in both series after 24 hours, and acetone extracts from the flies were tested on further flies. The resulting mortality percentages averaged 7–13 for the first series and 30–36 for the second. The difference in the first case was not significant, but it is too great for quantitative determination and would be even greater for batches containing both sexes, since topical application of 0·472 mmg. per fly to individuals averaging 12·2 mg. in weight caused 60 and 37 per cent. mortality of males and females, respectively. Further, mortality varies with the weight of the flies, topical applications of 1·062 mmg. per female resulting in 56, 64 and 86 per cent. mortality of flies with average weights of 15, 12 and 9·6 mg., respectively. Although these differences were considerable, the products of average weight and mortality percentage (840, 768 and 826) were remarkably constant, and the mortality can therefore be standardised to refer to a uniform average weight. When the results of the last test were transformed in this way for a fly weight of 12 mg., the mortality percentages were 70, 64 and 68, or an average of 67·3, as compared with the experimental average of 68·7. In tests with topical applications of 0·008 mmg. lindane [almost pure γ BHC], the similarly transformed percentages were 52 and 53·2 for flies weighing 250–280 and 190–210 mg. per batch of 25.

The results of tests of insecticides are best analysed by the construction of log-probit dosage-mortality curves that allow determination of the median lethal dose or that giving any other desired level of mortality. The method of doing this is illustrated from tests with DDT, and curves based on experiments with house-flies are given for aldrin, lindane, dieldrin, parathion, toxaphene and DDT, for which the median lethal doses in mmg. per gm. fly weight were 0·42, 0·73, 1·1, 1·56, 19·2 and 55, respectively.

Bradbury, F. R. & Standen, H. **The Colorimetric Determination of Benzene Hexachloride in Insect Tissues.** Reprinted from *J. Sci. Food & Agric.* 1954, May, No. 5, 252–6, 2 figs.

An earlier paper by Armstrong, Bradbury and Standen [this *Bulletin*, 1952, v. 49, 93] described the passage of BHC isomers through the insect cuticle; this included a description of a microchemical method of estimating

BHC. This technique [not described in the abstract mentioned] depends on (i) hydrolysing the BHC to trichlorobenzene, (ii) nitrating to trichlorodinitrobenzene, and (iii) hydrolysis with caustic soda to produce chlorodinitroresorcinol. The last-mentioned compound is yellow and can be estimated colorimetrically.

The present communication explains the chemical basis of this technique and illustrates the calibration curves obtained with the use of a spectrophotometer. (The curve shows a change of one unit of optical density for a difference of 100 microgrammes of BHC.) It also describes in detail an improved method of extracting the BHC from insect tissue, and separating it from fat, by percolation through a column of kieselguhr soaked in carbon tetrachloride and oleum.

[Anyone wishing to conduct the full extraction and estimation should obtain the text of this paper and the previous one (*loc. cit.*: *Ann. Applied Biol.*, 1951, v. 38, 555) and would require a spectrophotometer as well as normal laboratory equipment.] *J. R. Busvine*

Carrillo, S. J. El empleo del dieldrín en Venezuela. [**Use of Dieldrin in Venezuela**] *Bol. Oficina Sanitaria Panamericana.* 1954, July, v. 37, No. 1, 76–81.

The English summary appended to the paper is as follows:—

"A description is given of the experiments made in Venezuela by the Division of Malariology, Department of Public Health, with the use of dieldrin insecticide. A total of 6,250 man/days of work was used in a project to spray sixty thousand houses.

"It was demonstrated that dieldrin is a triatomicide of lethal action lasting for several months. Experimentally, this residual action was maintained from 16 to 36 months with applications of 0·5 and 1 g per square meter, respectively. In the field, the results were most satisfactory, even at the end of seven months with the use of the same doses, and it is hoped that, in time, field results will equal those obtained in the laboratory.

"The aqueous suspension is more effective in spraying absorbent surfaces (adobe and similar material).

"There is not sufficient evidence to attribute the upsets suffered by 7 sprayer-handlers to intoxication by dieldrin.

"Several cases of animal poisoning were caused by accidental ingestion of the insecticide, and it was observed that it can be eliminated through their milk.

"The paper presents a series of recommendations to the public and describes the precautions to be taken by the personnel who handle and apply the insecticide."

Roy, D. N. & Brown, A. W. A. **Entomology (Medical and Veterinary) including Insecticides and Insect and Rat Control.**

This book was reviewed in this *Bulletin*, 1954, v. 51, 1321.

MISCELLANEOUS PAPERS

Deverell, N. M. **The African Child in an Urban Environment.** *East African Med. J.* 1954, Apr., v. 31, No. 4, 175–9.

This is a sociological rather than a medical study of African children in Nairobi, Kenya; some of these spend a few years of childhood there with

their parents, and then go back to their own districts, others are permanent residents. The first group consists of children of the more highly trained workers, and their plight is reasonably good, but many of the children who live permanently in Nairobi are the illegitimate children of men who cannot afford to have their families with them in the city. Some children come to Nairobi for education, and live with relatives, and they often remain; other children are casual visitors.

The general picture is of children and parents who have lost touch with tribal life and dignity, who find little or no incentive at home to live any other than an acquisitive, racketeering life, though efforts are certainly made by the YMCA to introduce more healthy interests. Such efforts should be greatly expanded.

The picture has its health importance. "A night inspection in the African Locations will reveal women and children sleeping in passages, under beds, or small children laid across the foot of beds already occupied by three adults. They thus stand a very good chance of picking up any infectious diseases going, and taking them home with them."

The author is a Social Welfare Officer. *Charles Wilcocks*

REPORTS AND SURVEYS

Anais Inst. Med. Trop. Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 1, 485–1106. Número dedicado ao 1.° Congresso Nacional de Medicina Tropical. Doenças infecciosas (viroses, rickettsioses, espiroquetoses, doenças bacterianas e micoses). [**Proceedings of the First National Congress of Tropical Medicine. Infectious Diseases: Virus, Rickettsial, Spirochaetal, Bacterial and Mycotic Infections**]

Four contributions published at the beginning of this bulky volume under the heading Symposium are concerned with the laboratory diagnosis of yellow fever, dengue and sandfly fever; the antigenic structure of members of the psittacosis-lymphogranuloma group of viruses; the diagnosis of rabies, and the laboratory diagnosis of poliomyelitis. The remaining 66 contributions are styled Original Works; all but one are in Portuguese. For the most part they are concerned with work done in Portugal or in Portuguese possessions overseas, and cover a wide range. Tuberculosis, leprosy, yaws, venereal diseases, trachoma, Q fever and other rickettsial infections, brucellosis, poliomyelitis and salmonella infections are among the diseases discussed. *Norman White*

Anais Inst. Med. Trop. Lisbon. 1952, Dec., v. 9, No. 4, 1037–506. Número dedicado ao 1.° Congresso Nacional de Medicina Tropical. Helmintíases e protozooses. [**Proceedings of the First National Congress of Tropical Medicine: Helminth and Protozoal Infections**]

This volume of 470 pages opens with a lecture delivered in English to the Congress by E. C. Faust on the Control of Schistosomiasis. Of the remaining 43 papers contributed to the Congress, which are here reproduced, three are in French, four in English and the remainder in Portuguese. Schistosomiasis receives most attention—13 papers. Seven contributions are concerned with amoebiasis, 6 with ankylostomiasis, 4 with filariasis and 2 with leishmaniasis. *Norman White*

Ferreira, E. C. Distribuição e incidência de algumas endemias de Angola. [**Distribution and Incidence of some of the Diseases endemic in Angola**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 3, 1739–75, 4 maps. [10 refs.] English summary (9 lines).

In his introductory remarks the author states that the more important diseases in Angola are malaria, leprosy, ankylostomiasis, urinary schistosomiasis, yaws and trypanosomiasis and that racial decadence is largely due to malaria, schistosomiasis, trypanosomiasis and intestinal parasites. He goes on to discuss some of these in various parts of 15 districts in 5 provinces, with maps showing the prevalence of malaria, hookworm, schistosomiasis and yaws, and tables showing the incidence in different districts.

Malaria is especially rife in Malange province and variable in other districts. Ankylostomiasis affects 70 to 93 per cent. (in Cuango 96 per cent.) and amoebiasis in 40–50 per cent. of those complaining of intestinal disturbance. Among the apparently healthy, 5–14 per cent. are infected with hookworms and the incidence may be as high as 92 per cent. in children below 10 years of age. The incidence of yaws shows large oscillations; for example, in Maiombe the numbers registered in the years 1946 to 1950 were successively 1,911, 624, 1,203, 1,073 and 296; the average in the country for the 5 years was 4,120. Throughout the paper the maps and tables indicate much detail which is, however, more of local than of general interest. *H. Harold Scott*

de Freitas, J. A. Trabalhadores indígenas de Angola, sua alimentação. doenças predominantes e algumas medidas profiláctica adoptadas [**Angola Labourers, their Nutrition, Chief Diseases, and Prophylactic Measures adopted**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 2, 1157–84, 14 figs. English summary.

This article is very general and does not go into detail. The indigenous Angolan is of poor physique, with an average weight of 50 kgm., and suffers from mal- or innutrition, schistosomiasis and other intestinal parasites. When employed by good firms he is properly fed and attended to medically, and he puts on weight and improves much in general health. The monotony of diet for the ordinary man leads to toxic diarrhoea and later to avitaminosis, especially C, wasting and cachexia; scurvy particularly in Benguela and Moçâmedes, and beriberi in the north; pellagra and ariboflavinosis are also met with; dysentery, bronchopneumonia and infective disease such as influenza are common. Tuberculosis is the gravest of the imported diseases and it is suggested that all non-allergic labourers should undergo a BCG vaccination. Trypanosomiasis is rare, as also is smallpox since almost universal vaccination has been introduced. *H. Harold Scott*

Delgado, J. A. de B. A. Incidência e condições de desenvolvimento das doenças endémicas na área sanitária de Tete e causas das doenças da nutrição. [**Endemic Disease and the Causes of Malnutrition in Tete (Mozambique)**] *Anais Inst. Med. Trop.* Lisbon. 1953, Sept., v. 10, No. 3, Fasc. 3, 1779–92. English summary.

The chief endemic diseases in Tete are malaria, schistosomiasis, yaws, tropical ulcer, syphilis and dysentery. Malaria, mainly subtertian, in the 5 years 1947–51 inclusive accounted for 1,092, 1,040, 1,506, 2,237 and 1,317

and there were 2 or 3 cases of blackwater fever each year. The incidence of amoebic dysentery, or at all events the number of cases confirmed in the laboratory, has risen considerably during the same quinquennium from 20 in 1947 to 280 in 1951; in 1950 the figure rose to 349; hepatitis is rare and only one case of liver abscess was treated. Ankylostomiasis is uncommon, the greatest number being 83 in 1951; ascariasis patients are given as 260. Yaws has shown a fairly steady increase in cases, the numbers in successive years being 140 (in 1947), 67, 121, 201 and 252 (in 1951). Tropical ulcers [the form is not mentioned] have varied from 321 (in 1949) to 833 (in 1948). Pulmonary tuberculosis does not appear to be common; only 7 cases were notified in 1951, but some run a very acute course. Leprosy, again, is rare; most are of the *tuberculosa* [? nodular] form and as soon as a case is diagnosed the patient is hurried off to the leprosarium at Panjovo [perhaps, in part at least, this accounts for the paucity of cases notified], 9 in 1947, and in the next 4 years, 3, 3, 0 and 2. Syphilis is fairly common; 135 cases of congenital disease were noted in 1951 and 100 in 1950, and the acquired form has increased from 75 in 1947 to 193 in 1951; in 1950 the number was 301; gonorrhoea is less frequently seen. Schistosomiasis, both vesical and intestinal, is common. In Benga, among 378 persons whose faeces were examined for ova of *S. mansoni* 200 (52·9 per cent.) were positive; in other districts the percentage positive varied considerably; in one, 16 out of 205 (7·8 per cent.), in another 167 out of 409 (40·8), in a third 20 out of 197 (10·1), in a fourth 202 out of 513 (39·3). Of 429 urines examined for ova of *S. haematobium* in Benga 244 (56·8 per cent.) were positive. In other districts the percentage varied from 25·9 among 267 to 53·7 among 106.

Malnutrition is ascribed to the poverty of the soil, the scarcity of rainfall, the practical absence of fruits, deficiency of vitamins and the abuse of alcohol. *H. Harold Scott*

Bierdrager, J. & de Rook, H. **Health Conditions in Netherlands New Guinea.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1954, Sept., v. 6, No. 3, 252–66, 1 map & 2 charts. [14 refs.]

In a review it is possible to mention only some of the more important findings discussed in this paper. Malaria is a serious problem, especially among the sparsely distributed and susceptible Indo-European colonists on the north coast. Since anti-malaria measures are not practicable these people are advised to take suppressive proguanil. The authors instead recommend screening of houses because the local vector, *Anopheles punctulatus*, enters houses only to feed and does not rest there. The indigenous Papuans cannot be protected, and since they develop a considerable degree of immunity they should be allowed to acquire this, though heavy infant mortality from the disease should be prevented. The Papuans recognize the gravity of malaria in children and appreciate the value of quinine. The situation could be met by making quinine tablets available in individual " cellophane " wrappings and sold at a low price. DDT is unlikely to be of value against *A. punctulatus* but its residual effect should be investigated.

Yaws is an important disease among primitive communities in lowland areas where it is responsible for the majority of attendances at clinics. The medical service is at present too small to make effective use of modern methods of treatment among the rural inhabitants. A special branch devoted exclusively to Papuans is needed and it should make use of

indigenous nurses in mass treatment campaigns. Granuloma inguinale is the only venereal disease with a significant incidence; it occurs in the south of the territory, particularly in Frederik Hendrik Island. Filariasis due to *Wuchereria bancrofti* is common among the Papuans, in some areas with an incidence of elephantiasis approaching 5 per cent., but white immigrants do not become infected. *W. malayi* infection is unknown. Scrub typhus was common during the recent war with 8,700 cases, but since then only 16 cases have been diagnosed. It is possible that the disease may become serious again if abandoned estates are re-opened. Among the intestinal infections amoebic dysentery is only occasionally seen, but bacillary dysentery is prevalent everywhere. Hookworm infection is also ubiquitous but only rarely shows clinical effects.

Deficiency diseases are uncommon in the peasant population. Rice is not grown by the Papuans, but it is the staple food in artificial communities (gaols, barracks, labour camps) where beriberi is common. As unpolished rice can rarely be obtained, the polished rice should be enriched by adding to it 0·5 per cent. Roche-mix which is a rice with its thiamine content artificially raised 200 times above normal. *T. H. Davey*

Hulshoff, A. A. **Medical Examination of Repatriated Dutch Nationals from Indonesia, 1946–1951.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1954, June, v. 6, No. 2, 131–41, 1 graph.

The paper amounts to a catalogue of the clinical and parasitological findings in Dutch nationals who returned from Indonesia after World War II. It should be read in the original by those interested.

The author's summary is as follows:—

"1. Cases of cosmopolitan diseases were remarkably few among the ex-internees of Japanese concentration camps in Indonesia.

"2. Most malaria patients were cured before they arrived in the Netherlands; after arrival there, malaria—even when relapsing—gave less trouble than did chronic abdominal diseases.

"3. Many chronic abdominal diseases were found among the ex-internees; the affections were hard to manage.

"4. Fatigue occurred most often after deficiency diseases, less after other affections. Few people in the camps recognized the condition.

"5. Many persons harboured intestinal worms without serious symptoms.

"6. The general condition of the ex-internees after coming home was better than might have been expected. These people—the children excepted—recovered rather quickly.

"7. Deficient nutrition may have had a deleterious influence on the liver." *B. G. Maegraith*

Rahm, U. La Côte d'Ivoire, Centre de Recherches tropicales. Possibilités pour la participation suisse à l'exploration de la Côte d'Ivoire. [**The Ivory Coast, a Centre for Tropical Research. Possibilities for Swiss Participation in Exploration**] *Acta Tropica.* Basle. 1954, v. 11, No. 3, 222–95, 31 figs. & 4 maps. [Numerous refs.]

A detailed geophysical, botanical, zoological and ethnographical account of the area.

BOOK REVIEWS

Anderson, Hamilton H. [M.D.], Bostick, Warren L. [M.D.] & Johnstone, Herbert G. [Ph.D.]. **Amebiasis: Pathology, Diagnosis and Chemotherapy.** pp. xiii + 431, frontispiece, 50 figs. (2 coloured) & 1 pl. 1953. Springfield: Charles C. Thomas, 301–327, East Lawrence Avenue, Illinois. [83s.]

This volume has been written jointly by the professors of Pharmacology and Experimental Therapeutics, of Pathology, and of Parasitology in the Medical School of the University of California. In their preface they state that their purpose is to present the environmental background, modern methods for detection, and modern methods for control of a disease of increasing importance in temperate as well as tropical climates. This disease is "amoebiasis", which recently has been the subject of a concerted effort by specialists to ensure its recognition as a public health problem in the United States. Later in the book it is made clear that there is a fear that the return of large numbers of persons who have acquired *Entamoeba histolytica* infections overseas will cause an increase in the incidence of the parasite in the population throughout the United States, and that the possibility of epidemics resulting from this cannot be ignored.

The considerable subject matter is dealt with in 12 chapters, together with an introduction and a technical appendix. Each chapter is largely self-contained; after dealing with the literature on a particular aspect of the subject, the authors state their own views and conclusions; at the end of each chapter is a summary of its contents, and a bibliography. Where appropriate in the text there are tables, diagrams and photogravure plates —all of them clear and well reproduced. The literature on amoebiasis is so large that obviously it cannot all receive attention in a volume of this size. That cited is largely American, and is fairly presented. The conclusions reached from its study are on the whole equitable, and the authors skilfully avoid those dogmatic assertions which only too often obtrude themselves in discussion on so highly controversial a subject as amoebiasis.

It is inevitable that not every one of the authors' views and statements will be received with unqualified approval. There will be no dispute with their opinion that certain remarkable published figures of incidence of amoebiasis (some of which they list in tables) in various parts of the world, and that records of recovery of parasites from urine, from joint fluids, from lymphatic glands, and from other bizarre locations, must be treated with reserve until they are adequately substantiated. Although they hold the view that amoebiasis (which is referred to as a disease) can but rarely be dissociated from tissue changes, in view of the invasive properties of the parasite, it is at least appreciated that the symptoms in persons suffering from the non-dysenteric form of the condition are intestinal, and they do not accept the extraordinary range of vicarious symptomatology ascribed to amoebiasis by some writers. The section on diagnosis contains some sound and well-expressed views on the supreme importance of the laboratory diagnosis of amoebiasis; the so-called therapeutic diagnosis of bizarre symptomatology finds no place in it. The importance of knowledge and long practice in the recognition of the intestinal protozoal infections is properly emphasized, and serological tests are recognized to be insufficiently developed to be of material value in clinical practice.

Where issue may seriously be joined is the concentration of attention on amoebiasis seen as a "disease" in the temperate parts of the Western

Hemisphere. The reader is left with the impression that the authors' acquaintance with acute amoebic dysentery and its complications as seen in practice in the tropics is but slight. There is the use of an unfortunate phraseology in certain sentences, and this renders their interpretation at best obscure and at worst erroneous. For example, there is the statement " since emetine hydrochloride does not eradicate the cysts of *E. histolytica* there is still danger of reinfection "; and again " the ideal amebicide should be absorbed and distributed in its active form so that it is effective systemically against trophozoites in tissues as well as against cysts and motile forms in the bowel "; and yet again " Emetine has no reputation as a cysticide ". Once more, speaking of emetine, is the statement that this drug has not proved uniformly satisfactory because a large number of patients relapse after its use; for this reason, and because of its toxicity, the use of emetine is discouraged—but no satisfactory alternative to it for arresting the clinical course of an acute and severe attack of amoebic dysentery is proffered. No reputable worker claims that emetine alone will sterilize an intestinal infection with *E. histolytica*, but it should be stated that there are few clinicians in the tropics who do not consider that it is at present irreplaceable for certain limited purposes in the treatment of the acute disease. What may prove adequate in the treatment of amoebiasis in North America may not be as effective in the control of " amoebic dysentery " in the acutely sick in the torrid parts of the world.

These and similar matters of opinion and interpretation stimulate interest in the subject matter, and they do not necessarily detract from the handling a difficult and involved subject has received in this book. There is much repetition in the various sections of the book; this may be unavoidable as it seems to be the intention of the authors to make each section substantially a complete entity. There is every evidence of careful preparation of the book, and misprints are few; the printing, quality of paper, and production as a whole are those today expected of American publishers. The price in Britain is disproportionately high in relation to the size of the volume, as it is published in America. To those engaged in work on many aspects of amoebiasis it can be recommended as a valuable source of reference. It will prove of less value to those who are physicians concerned primarily with amoebic dysentery and its graver complications in the tropical parts of the world and not with amoebiasis in the temperate climates.

A. R. D. Adams

Oldroyd, H. [M.A.]. **The Horse-Flies (Diptera: Tabanidae) of the Ethiopian Region. Vol. II.** *Tabanus* **and Related Genera.** pp. x + 341, 238 figs., 31 maps & 5 pls. 1954. London: British Museum (Natural History). [45s.]

The review of the first volume of this work [see this *Bulletin*, 1952, v. 49, 1091] made it clear that it will fill a major gap in the literature relating to blood-sucking flies. The work is carried out by an expert in the British Museum and published in a worthy and impressive manner.

The first volume dealt in the main with the species of *Haematopota*: the present one deals with *Tabanus* and with the other genera which together form the tribe Tabanini. The third and final volume will deal with Chrysops and other Pangoniinae. The present volume deals with 147 species. We note that the males of about half of them are described, which is remarkable because as the males are not blood suckers they are seldom encountered and then generally only by skilled collectors. What little is known of the biology is brought together in the introduction. One may

remark that now that the systematics has been put on a sound basis and made available in one book, work on the biology will surely be facilitated and we may hope will follow. It is hardly possible to review a book on systematics and we must leave this most valuable work to the appreciation of those who will use it.

P. A. Buxton

Mourant, A. E. [M.A., D.Phil., D.M.] **The Distribution of the Human Blood Groups.** With a Foreword by H. J. Fleure, F.R.S. pp. xxi + 438, 4 figs. & 9 folding maps. 1954. Oxford: Blackwell Scientific Publications, 24–25 Broad Street. [42s.]

The Hirszfelds discovered at the end of the First World War that the frequency of the ABO blood groups varied in different peoples. Since then an enormous amount of work has accumulated not only on the distribution of the ABO groups but also on that of the blood group systems elaborated afterwards. This book brings a comprehensive account of the data widely scattered in the literature. It begins with a survey of the genetics and the anthropological significance of the different blood group systems: ABO, Rhesus, MNSs, Lewis, P, Lutheran, Kell, Duffy, Kidd. Other simple genetical systems such as the ability to taste phenylthiocarbamide and the sickle-cell trait are promoted to the status of honorary blood groups and are fully discussed. Detailed geographical surveys follow: Northern and Central Europe, Africa south of the Sahara, the Mediterranean area, Asia, Indonesia and Australasia, America. There are chapters on hybrid and migrant populations, on the blood grouping of animals and of bones and tissues. All this is surveyed by a brilliant chapter called " Attempt at a Synthesis ". One might expect that here the book would come to an end, but this is only the first half.

The second half deals with technical problems: laboratory procedures and calculation of gene frequencies. It presents a detailed bibliography of some 1,700 references as well as blood group distribution maps based on the principle of isobars which are completely original and fascinating to study. Twenty-six blood group frequency tables follow and an exhaustive list of the frequencies of the sickle-cell trait. There are three indices, one topographical and one zoological to the bibliography, and one general to the text.

Though this book cannot be called a " must " for the medical man in the tropics, one feels confident that it will offer enjoyable reading and stimulus to all those interested in the different races of mankind.

H. Lehmann

Cocker, Dorothy E. [S.R.N., S.C.M.] **Aids to Tropical Nursing.** With Foreword by R. G. Cochrane, M.D., F.R.C.P. 3rd Edition. pp. xii + 237, 25 figs. 1954. London: Baillière, Tindall & Cox, Ltd., 7 & 8 Henrietta Street, W.C.2. [6s.]

There are many additions and improvements which make the third edition of this textbook more valuable, not only for nurses but also as a guide for all women who are resident in tropical countries. In particular, the improved chapter on the care of children in the tropics should be of very great value to young mothers who are going overseas for the first time.

Some of the statements made and the treatments suggested, however, could be more carefully explained in their general application. For example, the use of grated apple in cases of gastro-intestinal infection in young children

might be supplemented by equally detailed advice for those parts of the tropics in which apples are extremely difficult to obtain.

The new chapter on the care of equipment will also meet a great need but there is still room for more information about improvisations and adaptations, especially for the benefit of those nurses who are taking up a first appointment in the tropics and whose whole professional experience has been gained in hospitals in Britain where electricity, running hot and cold water and modern sanitation are taken for granted.

While the preface to this edition acknowledges help given by colleagues in Africa and South America in widening the scope of the book, there still seems to be an over-emphasis on India. This is particularly true of the introductory paragraphs of the chapter on dietetic errors and disorders: these would be considerably improved if some mention were made of the dietetic values and deficiencies of the staple foods of the indigenous peoples of other tropical countries.

But these criticisms of detail are indicative of the interest which the book arouses and of the ease with which it is read. In general terms it amply fulfils the aim of the Nurses' Aids Series, *i.e.*, to be an aid to knowledge and to provide just that quantity of information which the nurse needs to possess, gathered together in concise and simple volumes at a price within the means of any nurse.

As Dr. R. G. Cochrane says in his foreword to this edition, " Miss Cocker has produced a compact work which gives . . . sufficient information to enable the reader to build up a sound knowledge of the causation and nature of the commoner diseases ". That there is room for still further improvement does not seriously detract from the value of this new edition which should indeed " . . . . be welcomed by all workers who are engaged in or who contemplate nursing in the tropics ".

Florence N. Udell

Connecticut State Department of Health. **Physicians' Guidebook to Public Health Laboratory Services.** [Osborn, S. H. (M.D., Dr. P.H.), Commissioner, Hartford, Connecticut.] 2nd Edition. 95 pp., 1 chart. 1954.

[This review also appears in the *Bulletin of Hygiene*, 1955, v. 30, Feb.]

This book lists nearly 100 diseases with notes on their aetiology, source of infection, mode of transmission, prevalence, current laboratory services, collection of specimens and limitations of laboratory tests. Although it was compiled for doctors in Connecticut and the laboratory services and outfits it refers to are, naturally, of local interest only, it includes many tropical diseases which may be expected to occur in service men returning from overseas and its scope is wider than would appear at first sight. Altogether it is a useful and competently presented work of reference.

John Rathborn

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